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Assessing the effectiveness of planned adaptation in rural Pacific Island communities: case studies from Fiji and Kiribati

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Abstract

Rural coastal communities in Pacific Island Countries (PICs) are amongst the world's most vulnerable to climate change. This is due to a combination of both high physical exposure (from sea-level rise, increasingly intensified storm surges, tidal inundation, and coastal erosion) as well as a range of underlying social, cultural, historical, economic, and physical factors that generate and drive vulnerability. As such, a plethora of adaptation projects intended to assist such communities in reducing their vulnerability to experienced and future climate change impacts have emerged, with the Pacific Region receiving the highest per capita climate aid globally. Owing to the inadequacies of traditional top-down approaches in achieving successful outcomes for communities, projects implemented at the community level, known commonly as community-based adaptation (CBA) and seen as a bottom-up approach, have been increasingly implemented. Yet, if such projects have been effective in reducing the vulnerability of targeted groups remains equivocal owing in part to the limited (yet growing) empirical case study material.

This thesis aims to better understand if community adaptation projects implemented in rural coastal communities in PICs have been successful in providing sustained outcomes and benefits, and further provide insights into how adaptation can be improved in the future. This is achieved through a review of CBA projects published in the grey literature (Chapter 2.0), and three in-depth qualitative case studies across the tripartite of adaptation responses: retreat, protect, and accommodate from communities in both Fiji and Kiribati (Chapter 3.0, 4.0, and 5.0). In total, 16 focus groups (FGs) and 41 interviews were undertaken with a total of 205 participants.

First, a review of CBA grey literature is undertaken to gain a snapshot of CBA initiatives globally and explore the main barriers to adaptation success. The grey literature reviewed included reports undertaken by donors, non-governmental organisations (NGOs), and international NGOs (INGOs). These reports hold a wealth of information on, and lessons about, CBA as these are the organisations often responsible for implementing and reporting on projects. In undertaking this review it was found that the most common barriers to adaptation success

were cognitive and behavioural. These barriers reveal limited interest by community members in CBA projects, as well as projects not being in line with the social and cultural views of target communities. This raises questions about the usefulness and role of CBA in reducing people's vulnerability to climate change impacts in future adaptation efforts. Further, this review detailed the need for evaluation of adaptation from the perspective of those adaptation has been implemented to assist – that of the community.

Next, this thesis contributes to the dearth of in-depth case studies, especially those evaluating adaptation from community perspectives. This is achieved through providing an in-depth case study across each of the tripartite of adaptation responses: retreat, protection, and accommodation. This includes a case study of planned relocation (retreat) in two communities – Vunidogoloa and Denimanu – on (and off the coast of) Vanua Levu Island, Fiji; a case study of seawalls (protection) implemented in two communities – Karoko and Korotasere – on Vanua Levu Island Fiji; and a food security project (accommodation) implemented in two communities – Tuarabu and Tabontebike – on Abaiang Island, Kiribati.

The three projects were evaluated in terms of their success across the following criteria: appropriateness, efficacy, equity, impact, and sustainability. Overall, despite projects having broad scale appropriateness in terms of being targeted at objective climate related issues (such as flooding or food security), projects had minimal impact and were mostly unsustainable despite being implemented in the five years prior to undertaking field work. In addition, the equity of projects, in terms of access to processes and decision-making, was largely lacking. Key issues that arose within each case study are discussed accordingly and include the need for context specific adaptation driven by local needs and values, the potential of projects to lead to maladaptive outcomes, and the need to consider the wider context of what generates and drives vulnerability in communities. Relevant recommendations and suggestions for enhancing the sustainability of adaptation success are presented and discussed.

Overall, this thesis shows that adaptation activities implemented in rural Pacific Island communities are largely failing in achieving their aims. This is owing to the fact that projects are driven by externally defined goals, view communities as homogeneous entities, and are too narrowly focussed on biophysical climate impacts rather than the wider factors that

generate and drive vulnerability. A number of unintended, negative outcomes have also been identified including projects inadvertently increasing the vulnerability of target communities. The core conclusion of this thesis is a call for more long-term planning and assessment of site-specific adaptation measures that actively involve and are driven by local perspectives in the planning, implementation, and maintenance process, and account for the heterogeneity in local contexts, both climate and non-climate related.

Declaration of Authorship

This thesis *is composed of my original work, and contains* no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

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Publications included in this thesis

Piggott-McKellar, A.E., McNamara, K.E., Nunn, P.D. and Watson, J.E.M. 2019. What are the barriers to successful community-based climate change adaptation? A review of grey literature. *Local Environment*, 24(4), 374–390. DOI: 10.1080/13549839.2019.1580688

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Research reports

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Chapter 1

This chapter was written solely by the author with editorial assistance from Karen E. McNamara, Patrick D. Nunn, and James E. Watson.

Chapter 2

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This chapter comprises a conference paper presented at the *2nd Symposium on Climate Change Adaptation in the Pacific Region 2019,* Lautoka, Fiji, and subsequent book chapter in *Managing Climate Change Adaptation in the Pacific Region*, which is currently in press. This chapter was written solely by the author with editorial assistance from Patrick D. Nunn and Karen E. McNamara.

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Chapter 6

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Statement of parts of the thesis submitted to qualify for the award of another degree

No works submitted towards another degree have been included in this thesis.

Research Involving Human or Animal Subjects

Human ethics approval was sought and approved at the school level. The application was not subject to higher level review, as the research was deemed low risk. A copy of the ethics approval letter can be found in Appendix 4.

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"The earth is not ours to do with as we please – we are merely trustees for future generations. We ignore this reality at our peril."

Former Kiribati President, Anote Tong –

Table of Contents

Abstract **2**

Figures, tables, and plates **19**

Abbreviations **21**

1.0 Introduction **22**

1.1 Research Rationale **22**

1.2 Vulnerability to climate change in Pacific Island Countries **25**

1.2.1 Exposure 27

1.2.2 Sensitivity 28

1.2.3 Adaptive Capacity 29

1.3 Climate Change Adaptation in Pacific Island Countries **29**

1.4 Adaption to Sea-Level rise and associated coastal pressures **30**

1.5 Community-Based Adaptation **32**

1.6 Research Question, Aims and Objectives **33**

1.7 Research Framing and Methodology **35**

1.7.1 Undertaking cross-cultural research in a Pacific Island context 35

1.7.2 Case Studies 37

1.8 Thesis Overview and Structure **45**

2.0 Grey Literature Review: What are the barriers to successful community-based climate change adaptation? **48**

Place of chapter in thesis **49**

Statement of Authorship for this Chapter **50**

Abstract **51**

2.1 Introduction **51**

2.1.1 Community-based adaptation 52

2.1.2 Barriers to community-based adaptation 54

2.1.3 Study Aims 56

2.2 Method **56**

2.2.1 Project Criteria 56

2.2.2 Document Search 57

2.2.3 Analysis of Projects 59

2.2.4 Limitations 59
2.3 An overview of projects 60
2.4 Barriers identified in the grey literature 63
2.4.1 Cognitive and behavioural barriers 66
2.4.2 Financial 68
2.4.3 Human Resources 69
2.4.4 Barriers across implementing agencies 70
2.5 Discussion 70
2.6 Conclusion and future directions 72
3.0 Retreat: Exploring livelihood outcomes of planned relocation on Vanua Levu Island, Fiji 74
Place of Chapter in thesis 75
Statement of Authorship for this Chapter 76
Abstract 77
3.1 Introduction 77
3.2 Study Sites 81
3.2.1 Vunidogoloa 82
3.2.2 Denimanu 83
3.3 Methods 84
3.3.1. Data Collection and Analysis 84
3.3.2. Ethical Procedures 85
3.3.3. Study Limitations 86
3.4 Socio-Political Context of Relocations 86
3.5 To What Extent Have Livelihoods Been Either Positively or Negatively Affected by Relocation? 88
3.5.1. Housing and Community Infrastructure 88
3.5.2. Social Cohesion and Cultural Assets 90
3.5.3. Health and Education 90
3.5.4. Access to Common Property Resources and Food Security 91
3.6 Have Relocations Successfully Reduced Exposure to Climate-related Hazards? 92
3.7 Community evaluation of the adaptation project 94
3.7.1 High levels of Appropriateness 94
3.7.2 Limited Equity 95
3.7.3 Adequate Efficacy 95

3.7.4 Variable Impact and Sustainability 96
3.8 What Lessons Can Be Taken from These Case Studies Going Forward? 97
3.9 Conclusions 99
4.0 Protection: Seawalls as a case of maladaptation on Vanua Levu Island, Fiji 100
Place of Chapter in thesis 101
Statement of Authorship for this Chapter 102
Abstract 103
4.1 Introduction 103
4.1.1 Vulnerability to climate change in Pacific Island Countries 103
4.1.2 Climate Change (mal)adaptation 105
4.1.3 Coastal protection measures 107
4.1.4 Research aim and questions 108
4.2 Case study sites and project background 109
4.3 Methods 111
4.4 Implications and outcomes of seawalls for communities 112
4.4.1 Reducing exposure to coastal pressures? 112
4.4.2 Implications for land and livelihood security 114
4.5 Community evaluation of the adaptation project 115
4.5.1 Moderate levels of Appropriateness 115
4.5.2 Nonexistent Equity 116
4.5.3 Poor Efficacy 117
4.5.4 Deleterious Impact 117
4.5.5 Poor Sustainability 118
4.6 A case of maladaptation 118
4.7 Conclusions and future directions 120
5.0 Accommodation: Who defines 'good' climate change adaptation and why it matters: a case study from Abaiang Island, Kiribati 123
Place of Chapter in thesis 124
Statement of Authorship for this Chapter 125
Abstract 126
5.1 Introduction 126
5.2 Community-based planned adaptation in the Pacific region 128
5.3 Case study site and CBA project background 131
5.4 Methods 134

5.4.1 Qualitative research design and analysis 134
5.4.2 Project evaluation criteria 136
5.4.3 Research limitations 137
5.5 Community evaluation of the adaptation project 137
5.5.1 Average levels of appropriateness 139
5.5.2 Poor levels of equity 139
5.5.3 Adequate project efficacy 140
5.5.4 Limited impact and sustainability 141
5.6 Discussion 142
5.6.1 The need to account for the local context and underlying vulnerabilities 143
5.6.2 Who should define 'good' adaptation 146
5.7 Conclusion and future directions 148
6.0 Conclusion and Contributions 150
Place of Chapter in Thesis 150
6.1 Main Findings 151
6.2 Research limitations and challenges 155
6.3 Contributions to the literature 156
6.4 Future Research Directions 157
6.5 Concluding Remarks 159
References 160
Appendix 1: A livelihood analysis of resettlement outcomes: lessons for climate induced relocation 179
Place in Thesis 179
Statement of Authorship for this Appendix 179
Abstract 180
1.0 Introduction 180
2.0 Livelihood Analysis 184
3.0 Methods 186
3.1 Defining 'Community Resettlement' 186
3.2 Search method 187
3.3 Data analysis 188
3.4 Limitations 189
4.0 Overview of Resettlement Case Studies 190

5.0 Implications and Outcomes for Livelihoods 192
5.1 Natural 194
5.2 Social 195
5.3 Financial 197
5.4 Human 198
5.5 Physical 199
5.6 Cultural 199
6.0 Lessons for future climate-induced relocations 200
7.0 Conclusion and future directions 205
Appendix 2: Focus Group Guide 215
Appendix 3: Participant Information Sheet and Consent Form 223
Appendix 4: Ethics Approval Letter 226

Figures, tables, and plates

Figures

Figure 1: Framework of vulnerability, including concepts of exposure, sensitivity, and adaptive capacity. Adapted from Pelling (2011). *27*
Figure 2: The tripartite of adaptation responses: protect, accommodate, retreat. Source: Author. *31*
Figure 3: Overview of thesis structure including chapters and associated research aims. *35*
Figure 4: Case study design. Source: adapted from MacMahon (2017) *37*
Figure 5: Map of Fiji showing the two retreat case study sites (Vunidogoloa and Denimanu villages). *41*
Figure 6: Map of Fiji showing the two protection case study sites (Karoko and Korotasere villages). *43*
Figure 7: Location of accommodation case studies on Abaiang Island, Kiribati *45*
Figure 8: The place of chapter 2.0 in thesis. *49*
Figure 9: The place of chapter 3.0 in thesis. *75*
Figure 10: Map of Fiji showing the two case study sites (Vunidogoloa and Denimanu villages). *81*
Figure 11: The place of chapter 4.0 in thesis. *101*
Figure 12: Map of the two case study sites - Karoko and Korotasere - on Vanua Levu Island, Fiji *110*
Figure 13: The place of chapter 5.0 in thesis. *124*
Figure 14: Map of Kiribati showing the location of case study sites - Tuarabu and Tabontebike. *132*
Figure 15: The place of Chapter 6.0 in thesis. *150*
Figure 16: Search method utilised, along with the number of articles accepted at each stage *188*
Figure 17: The percent of case studies that described an outcome across natural, social, financial, human, physical, and cultural asset categories. *192*
Figure 18: The percent of case studies that described an outcome as positive, neutral, or negative, across natural, social, financial, human, physical, and cultural asset categories. *193*

Tables

Table 1: Overview of case study locations, including project focus, number of sites, locations, year project was implemented, number of FGs, number of interviews, and participant numbers. *40*
Table 2: Full list of the websites searched to find CBA project documents. *58*
Table 3: Overview of projects according to implementing agency, geographic location, sector, and climate change impact being addressed. *61*
Table 4: A list of the activities implemented in projects, along with a description of each and the percent of projects that used them. *62*
Table 5: Barriers to effective CBA identified within 25 documents. *64*
Table 6: Outcomes on community livelihoods from the village relocations in two communities, denoted as: Positive change (+), no change (0), negative change (-) *89*

Table 7: Example of responses given by respondents across the criteria and subsequent questions. 138
Table 8: Livelihood categories - definitions and examples. 186
Table 9: Overview of the drivers, location, year of publication, year of resettlement, and time between resettlement and study. 191

Plates

Plate 1: FGs in: Tuarabu Men (top left); Tabontebike Women (top right); Vunidogoloa Women (bottom left); Tabontebike Men (bottom right). ..... ***Error! Bookmark not defined.***
Plate 2: The new village relocation site of Vunidogoloa. 82
Plate 3: The new village relocation site of Denimanu. 83
Plate 4: FG exercise showcasing water surrounding a home in the old site of Vunidogoloa village. 92
Plate 5: The landslide that destroyed the primary school in Denimanu village. 94

Abbreviations

CBA	Community-based Adaptation
C-CAP	Coastal Community Adaptation Project
COP	Conference of the Parties
DIDR	Development-Induced Displacement and Resettlement
FG	Focus Group
GHG	Greenhouse Gas
INGO	International Non-governmental Organisation
IPCC	Intergovernmental Panel on Climate Change
KAP	Kiribati Adaptation Program
NGO	Non-governmental Organisation
PIC	Pacific Island Countries
SIDS	Small Island Developing States
SLF	Sustainable Livelihoods Framework
UN	United Nations
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development

1.0 Introduction

1.1 Research Rationale

The impacts of climate change are already being experienced across all regions of the world (Scheffers et al 2016). Even if greenhouse gas emissions reductions are drastic in the coming years, the impacts of climate change will continue unfettered in future decades given the impact of climate inertia (Betzold 2015; IPCC 2014c; Spires, Shackleton and Cundill 2014). These climatic changes include the increased frequency and intensity of extreme weather events, changes in precipitation patterns, sea-level rise, increased temperatures and ocean acidification (Voccia 2012). Countries in the Global South in particular will bear the brunt of the most adverse effects of these impacts (Althor, Watson and Fuller 2016; Dasgupta, Laplante, Murray and Wheeler 2011; Narain, Margulis and Essam 2011), due to a raft of reasons that includes not only heightened exposure and susceptibility but also constrained adaptive capacities, contributing to overall exacerbated vulnerability. Such vulnerability can be caused by a reliance on climate sensitive sectors (e.g. fisheries and agriculture), low incomes, insufficient infrastructure, high levels of population growth, limited food and water security, constrained health and education systems, inadequate power and decision making, and geographic and historical factors (Ayers and Forsyth 2009; Heltberg, Siegel and Jorgensen 2009; Jackson, McNamara and Witt 2017).

Despite high levels of internal resilience, Small Island Developing States (SIDS), which include all self-governing Pacific Island Countries (PICs) (Barnett and Campbell 2010), have been labelled as some of the most vulnerable places in the world to climate change. This is largely due to a combination of high exposure to climate change impacts as well as a range of underlying social, historical, political, and economic vulnerabilities exacerbated by comparative smallness and remoteness (Huq and Reid 2007; Jackson, McNamara and Witt 2017; Kelman 2014). Climate change impacts experienced in PICs are predominantly coastal and include rising sea levels, intensification of cyclones resulting in increased storm surge extent, coastal erosion, and changing rainfall patterns (Chand, Tory, Ye and Walsh 2016; IPCC 2014c; Keener et al 2012). Exposure to such climate change impacts is exacerbated by the

presence of people, livelihoods, services, and assets in places that can be adversely affected by these climate impacts (IPCC 2014b).

Given the immediacy of the challenges and risks posed by climate change, adaptation has emerged as a critical field of research and practice. Adaptation to climate change is defined as "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities" (IPCC 2014a: 1758) or put simply, adaptation is "managing the unavoidable" (Weir, Dovey and Orcherton 2016: 1020). Adaptation responses can be: anticipatory in that they take place prior to climate change impacts being observed, something also described as proactive adaptation; autonomous in that they are spontaneous or reactive responses; or planned in that they are a result of a decision to adapt to imminent or experienced climatic changes (IPCC 2014b). Planned adaptation is the focus of this thesis. The role of adaptation in international and regional climate change discussions is exemplified by the Paris Agreement, ratified in November 2016, which places great importance on adaptation in response to climate change, taking into account the urgent and immediate needs of countries in the Global South (United Nations 2015). This is of significance as the Paris Agreement is widely regarded as a turning point for global collaboration in tackling climate change with, at the time of writing, 186 parties having ratified the agreement (United Nations 2019).

It has become increasingly common over the past few decades for planned, external adaptation interventions (projects, policies and activities) to be implemented in PICs to assist in dealing with climate change. Within PICs there remains a heavy reliance on external funding for adaptation through bilateral and multilateral organisations. For example, between 2008 and 2012, adaptation finance to the Pacific Region was just under USD $80 million per annum (Donner, Kandlikar and Webber 2016). This dependence results in project design often being determined by understandings and priorities of foreign countries. Yet as a location's exposure and vulnerability (both physical and socio-political) differ greatly, so does the need for site specific targeted adaptation responses that acknowledge such diversity (Adger, Arnell and Tompkins 2005; Nunn and Kumar 2019b; O'Brien, Eriksen, Nygaard and Schjolden 2007; Sovacool, Linnér and Klein 2017). Consequently, the goals of projects implemented through these avenues may not necessarily align with the goals of national and local governments, or

even the preferences of target communities themselves (Barnett and Campbell 2010; Dean, Green and Nunn 2016). Further, the way that organisations, governments and institutions conceptualise vulnerability can greatly influence the focus and type and suitability of adaptation that is implemented (O'Brien et al 2007).

Within the adaptation sphere, community-based adaptation (CBA) responses have become increasingly prevalent owing to the realisation amongst the international community that traditional, top down initiatives have not generally been successful in providing effective and sustained real benefits to vulnerable communities (Dean, Green and Nunn 2016; McNamara and Buggy 2016). CBA interventions are defined as those that assist communities in adapting to climate change and must account for the impacts from climate change, either predicted or experienced, outside of what is classified as regular climate variability (Reid and Schipper 2014). By definition CBA is seen as "a community-led process, based on communities' priorities, needs, knowledge and capacities, which should empower people to plan for and cope with the impacts of climate change" (Reid et al 2009: 13). Yet despite the potential for CBA to provide benefits to affected communities, whether or not such projects are successful or not remains equivocal. Unfortunately, there have been few examples of planned adaptations producing successful long-term benefits for recipient communities in rural Pacific Island Countries (Nunn and Kumar 2019a).

With this context in mind, the impetus for this thesis is threefold. First, rural Pacific Island communities are amongst the world's most vulnerable to climate change with impacts projected to become more severe in the future (Nurse et al 2014). Second, planned adaptation projects are currently, and will continue to be, implemented in the Pacific Region with the aim of assisting vulnerable communities adapt to climate change (Robinson 2019). Third, there have been legitimate questions raised about the efficacy and sustainability of such adaptation projects in providing successful outcomes for recipient communities (Adger, Arnell and Tompkins 2005; Nunn and Kumar 2019a). As such, this thesis builds on this premise and aims to explore, drawing on case studies from Fiji and Kiribati, the effectiveness of planned adaptation projects implemented in Pacific Island countries and provide insight into how adaptation can be improved going forward to ensure effective and sustainable outcomes for communities throughout the Pacific.

1.2 Vulnerability to climate change in Pacific Island Countries

There is no universally used and recognised definition for vulnerability in reference to climate change and/or natural hazards (Cutter 1996; Füssel 2007). The most recent definition by the IPCC exemplifies this ambiguity, defining vulnerability as "The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt" (IPCC 2014a: 1775). Throughout the literature, how vulnerability is referred to, defined, and framed differs (O'Brien et al 2007) based on a range of factors such as the hazard referred to (famine, climate change, drought, technology), the region in which the study is being undertaken (the global north or the global south), and the disciplinary focus of the study (physical science, political ecology, human ecology) (MacMahon 2017). As a result of these varying factors, there is a level of ambiguity surrounding the meaning and function of the term 'vulnerability' in relation to climate change.

Historically, vulnerability was conceived from a hazard or biophysical perspective in that it was considered to be created by hazards (such as cyclones, earthquakes, tsunamis, drought) themselves. For example, the United Nations Disaster Relief Organization's (UNDRO) definition of vulnerability in 1980 was: "Vulnerability meaning the degree of loss to a given element at risk or set of such elements resulting from the occurrence of a natural phenomenon of a given magnitude and expressed on a scale from 0 (no damage) to 1 (total loss)" (UNDRO 1980: 5). This hazard-focused perspective is in line with concepts of vulnerability from disciplines such as physical sciences, economics and engineering. Over time, there has been a growing literature viewing vulnerability through a social lens, in that vulnerability is not solely a product of a hazard impacting upon a system, but is created by a range of political, social, and economic factors within a system that make it vulnerable to perturbations. Such framings have come from disciplines in geography, political economy, and the social sciences (MacMahon 2017). Some definitions that exemplify this view are: "vulnerability is best defined as an aggregate measure of human welfare that integrates environmental, social, economic, political exposure to a range of potential harmful perturbations" (Bohle, Downing and Watts 1994: 37), and; "the characteristics of a person or group and their situation that influence their capacity to

anticipate, cope with, resist and recover from the impact of a natural hazard" (Blaikie, Cannon, Davis and Wisner 2003: 11).

As vulnerability is not clearly defined within the literature and practice, institutions and organisations frame vulnerability differently. These different framings can significantly influence how adaptation is undertaken in practice and what type of projects and policies are implemented (Barrowman and Kumar 2018; O'Brien et al 2007; O'Brien and Wolf 2010). Building off previous work by Kelly and Adger (2000), O'Brien et al (2007) identify two contrasting concepts of vulnerability as outcome vulnerability and contextual vulnerability. Outcome vulnerability views the hazard (in this instance climate change) impacting upon an exposure unit, with responses targeted at reducing impacts from this hazard, thus aiming to reduce vulnerability. Conversely, contextual vulnerability looks to the system through which the hazard is acting upon as the starting point of vulnerability. That is not to discount a biophysical hazard, but rather view it and account for it after understanding the contextual elements of the system first. As O'Brien et al (2007: 76) states "The two depictions of vulnerability… are not simply about different interpretations of the word vulnerability. They are about fundamentally different framings of the climate change problem". This refers to the types of knowledge generated, how this knowledge is interpreted, and thus what policy and project components are targeted and implemented. Despite this important difference, most projects and policies do not refer to the framing of vulnerability used when developing adaptation strategies (O'Brien et al 2007).

Despite such definitional ambiguities, and a lack of consensus of what vulnerability means in the current academic literature, practice, and policy there is a general acceptance that vulnerability refers to the combination of the exposure of a system to outside perturbation, and the potential of that system to be harmed (Jackson, McNamara and Witt 2017; Tu'akoi et al 2018). As such, vulnerability to climate change refers to both the severity of a climate related impact (such as sea-level rise, increased storm surge activity, drought, increased temperatures, tidal inundation), coupled with the propensity of the associated social and/or physical system to be harmed by such climatic impacts. This component - the propensity to be harmed - can be broadly understood by viewing the system as a combination of sensitivity (i.e. institutional, social, historical, economic) and adaptive capacity (i.e. local knowledge, access to information

and assets, social capital). Combining these factors, a common framework that is used within academic literature, as well as practice for understanding vulnerability is that vulnerability is a product of exposure, sensitivity, and adaptive capacity (see Figure 1).

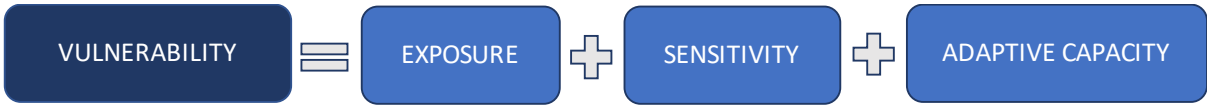


Figure 1: Framework of vulnerability, including concepts of exposure, sensitivity, and adaptive capacity. Adapted from Pelling (2011).

While overarching assertions of the Pacific Region being vulnerable to the impacts of climate change hold true, they do not account for the high levels of internal, often culturally-grounded, resilience within PICs, the people in which have survived and adapted to changes in local environments for often millennia, and hold significant levels of traditional knowledge and internal adaptive capacities (Barnett and McMichael 2018; Bryant-Tokalau 2018; Lefale 2010; McNamara and Prasad 2014; Nunn 2013). Further, the picture of the entire Pacific as vulnerable does not account for the significant variability in contextual factors that influence vulnerability. Across PICs there exists significant variation in geographies, climatic conditions, cultures and cultural norms, histories, political and governance structures, social capital, and economies. As such the view of PICs as a vulnerable homogenous entity is not sensitive to the nuances and significant level of heterogeneity across and within PICs. Acknowledging this heterogeneity, the following sections will explore the terms exposure, sensitivity, and adaptive capacity in PICs drawing on examples from the case study countries, Fiji and Kiribati.

1.2.1 Exposure

Exposure refers to the likelihood of a system to be impacted by a climatic event or natural hazard. As Ahsan and Warner, (2014: 33) put it, exposure is defined as "physically being in harm's way". The IPCC (2014a: 123) defines exposure as "The presence of people; livelihoods; environmental services and resources; infrastructure; or economic, social, or cultural assets in places that could be adversely affected (by climate impacts)." As such, there is a strong geographical element that influences exposure. PICs are highly exposed to climate change as they are (mostly) comparatively small and located in tropical and sub-tropical regions where

storm and cyclone activity is high and projected to increase into the future (Walsh et al 2016). The degree to which people are exposed is further influenced by factors such as island geography (high versus low lying) and geographical location (coastal versus inland) (Nunn, Kumar, Eliot and McLean 2016b). The numerous biophysical hazards and changes to which communities in PICs are exposed to include sea-level rise, extreme weather events, increased temperatures, ocean acidification, changes in rainfall patterns, and changes in wind and wave pattern (Barnett 2011; Chand et al 2016; IPCC 2014c; Keener et al 2012; Kumar and Taylor 2015). Accounting for all of these, the dominant climatic changes that are affecting Pacific island nations have been categorised into four by Nunn (2009). These are: increased climate variability (such as changes in annual rainfall and El Nino); changes in climate extremes (increased frequency and severity of tropical cyclones and droughts), temperature rise (a predicted increase in average temperature), and sea-level rise. Throughout nPICs, these impacts are already being experienced and projected to increase into the future, with evidence that state-of-the-art climate models are potentially underestimating the severity of future impacts (Hinkel et al 2018; Schewe et al 2019).

1.2.2 Sensitivity

Sensitivity refers to the interface between environments (including climate change) and people (MacMahon 2017), namely the likelihood of a system (social or physical) to be adversely affected by a climate change event (Adger 2006). There are many factors that can contribute to sensitivity (otherwise referred to as susceptibility), and include historical, social, economic, physical, cultural, environmental, and institutional factors (Jackson, McNamara and Witt 2017; Kumar et al 2018). Sensitivity is strongly linked to the livelihood resources available to people. Within communities themselves, there can exist differing layers and levels of sensitivity specific to factors like occupation, diversification of livelihoods within households, social networks, availability of and access to early warning systems to name a few. In a rural PIC context, people mostly rely directly on climate sensitive sectors, such as agriculture, and marine resources for their livelihoods. This results in high sensitivity to climate change, specifically multi-annual changes in rainfall patterns, oceanic and atmospheric temperatures, saltwater intrusion, and ocean acidification.

Rural Pacific Island communities are further becoming highly sensitive to an increased reliance on imported foods which can be impacted upon from sudden onset climatic changes such as severe weather events that may prevent imported food supplies reaching them for long periods of time. Other sensitivities exist including human health impacts through the likely increase of tropical diseases which is a threat to the health of many (Campbell 2015).

1.2.3 Adaptive Capacity

Adaptive capacity refers to the capacities and capabilities within a system that enhance resilience. Adaptive capacity can be seen as the ability of a population to respond to levels of exposure and sensitivity, and is defined as "The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences" (IPCC 2014a: 118). Ensor, Park, Hoddy and Ratner (2015: 39) define adaptive capacity as "the ability of social actors to make deliberate changes that influence the resilience of their complex social-ecological systems". Adaptive capacity has also been referred to as livelihood resilience within the literature (Jackson, McNamara and Witt 2017; Tanner et al 2014).

The literature on adaptive capacity is broad and extensive and discusses a range of factors that generate and drive adaptive capacity. These include both access to and degree of knowledge and information, access and participation by different people and groups in decision-making processes, social capital, human rights, poverty, institutional settings, political and governance structures, and strength of livelihood assets (Ensor et al 2015; MacMahon 2017). These factors can either contribute to or constrain adaptive capacities. In rural PIC communities there are a number of key aspects specifically relevant to how adaptive capacity is created and constrained. Of note these include access to and participation in community level decision-making, access to resources to enhance the ability to respond independently to climate change impacts, the recognition of local knowledge and internal adaptive capacities in the adaptation process, and access to sustainable livelihoods.

1.3 Climate Change Adaptation in Pacific Island Countries

The depiction of PICs as vulnerable has resulted in significant climate change funding being directed to the region. For example, between 2008 and 2012 adaptation finance to PICs was

just under USD $80 million per annum (Donner, Kandlikar and Webber 2016). Adaptation implementation comes largely through bilateral funds, and large multilateral funding schemes funded by developed countries and implemented by local governments and NGOs (Spires, Shackleton and Cundill 2014). A recent review of adaptation in Small Island Developing States (SIDS) shows that documented planned adaptation fit into three categories being structural or physical (i.e. engineering and infrastructural); social (such as educational, behavioural, or informational); or institutional (governance and policies, and law and regulation), with infrastructural and behavioural dominating (Klöck and Nunn 2019).

While there has been increased activity in implementing adaptation plans, whether adaptation is actually reducing the vulnerability of communities has often been questioned (Adger, Arnell and Tompkins 2005; Barnett and Campbell 2010; Nunn, Aalbersberg, Lata and Gwilliam 2014). As almost all of the funding for adaptation comes from developed countries (Nunn 2013), often project objectives are developed by development and donor organisations and agencies, resulting is questions being raised about the relevance of such projects to local social, economic, and cultural contexts (Barnett and Campbell 2010; Kumar 2015).

Evaluations of adaptation projects that have been undertaken across the region have shown at times failed and even maladaptive outcomes. For example, an analysis of the World Bank Kiribati Adaptation Program (KAP) showed that it was deeply flawed in its design and relevance to the nation's institutional framework and local capacity (Dean, Green and Nunn 2016). A study in Vanuatu found that development and adaptation projects have often been unsuccessful resulting from the community viewed as a homogenous entity and not accounting for the nuances and variation in local hierarchies, decision-making processes, and social dynamics (Buggy and McNamara 2016). Aside from the ambiguity of success of project outcomes, there have been broader questions raised about whether a reliance on external aid for adaptation by PIC governments has reduced capacity to independently adapt and diverted attention away from more pressing development needs (Barnett 2008; Webber 2013).

1.4 Adaption to Sea-Level rise and associated coastal pressures

When considering adaptation to coastal pressures resulting from sea-level rise and associated impacts, there are three categories of initiatives employed: protection, accommodation and

retreat (Nicholls et al 2007; Williams, Rangel-Buitrago, Pranzini and Anfuso 2018). The employment of these different adaptation measures depends heavily on the specific nature of the region affected which is dependent upon geographical, social, political, and economic factors. These three adaptations are depicted in Figure 2 and will be discussed below.

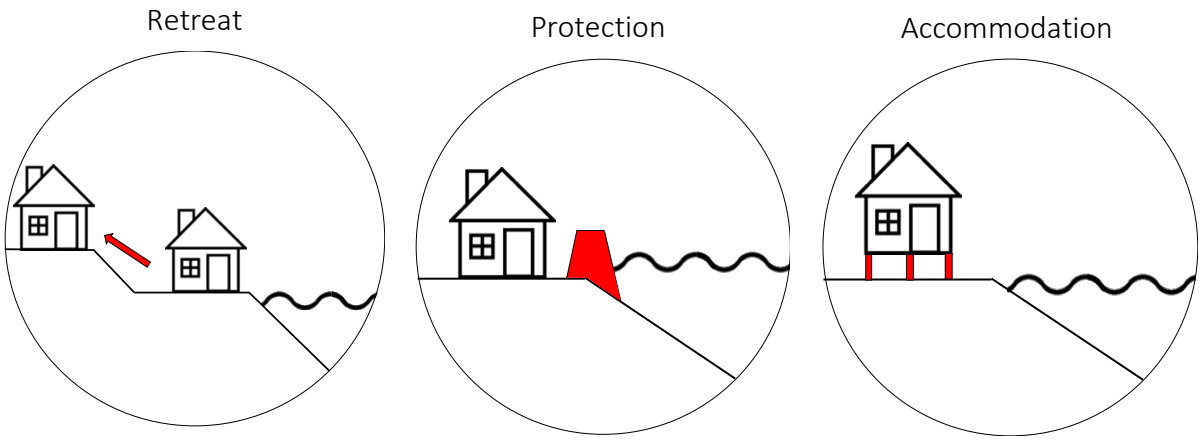


Figure 2: The tripartite of adaptation responses: protect, accommodate, retreat. Source: Author.

Retreat involves the process of physically moving away from a region of high exposure. Retreat is otherwise known as managed retreat, relocation, planned relocation, and resettlement. Here it will be referred to as relocation as this is a commonly used term in the adaptation literature (see Piggott-McKellar, Pearson, McNamara and Nunn 2019 - Appendix 1). It is important to make the distinction between autonomous retreat (or relocation) of communities, as opposed to planned relocation, which usually involves the coordination and management of the process by an external entity. Planned relocation (which is the focus of this thesis) refers to a "process in which persons or groups of persons move away from their homes or places of temporary residence, are settled in a new location, and provided with the conditions for rebuilding their lives" (UNHCR 2015: 9). Of note, within this definition is the explicit mention that relocation should include a focus on providing conditions through which relocated persons can rebuild their livelihoods. This is especially important to consider as research into other forms of resettlement, such as development-induced displacement and resettlement (DIDR) shows that frequently relocations are unsuccessful in providing successful and holistic outcomes for affected communities because they fail to address such ancillary concerns (Piggott-McKellar et al 2019 – see Appendix 1).

Protection responses refer to adaptation involving engineered structures which act as a 'protection measure' against coastal processes. Protection adaptations create a defence against the coastal processes which have the potential to inadvertently cause additional harm. Coastal protection measures can be broadly categorised as soft or hard (Few, Brown and Tompkins 2007; Nicholls et al 2007; Linham and Nicholls 2010). Soft measures refer to the use of natural materials such as mangroves or other natural vegetation that act as a natural defence buffer (Morris, Konlechner, Ghisalberti and Swearer 2018; Pilkey and Cooper 2012). Hard measures refer to built infrastructure and range from locally built ad hoc defences using available materials such riprap, machinery, or boulders, to the construction of planned seawalls or revetments (Shand et al 2017). In many instances these hard protection measures are funded externally through donor funded adaptation projects.

Accommodation measures can often be referred to as adapting infrastructure to allow for the impacts associated with coastal pressures such as regular flooding and sea-level rise. Some common strategies include flood proofing buildings and raising infrastructure. Throughout this thesis a more nuanced perspective on accommodation is taken whereby accommodation refers to an adaptation response that allows a coastal population to stay in place through enhancing their ability to cope with climate change *in situ*. While this does account for such infrastructural changes such as aforementioned, it also includes other changes such as diversifying livelihood assets and resources. As Doberstein, Fitzgibbons and Mitchell (2019: 32) states, "accommodation approaches are those adaptive strategies which are designed to allow continued use of flood-prone areas by improving the resilience of communities or valued facilities/infrastructure to occasional flooding, or by limiting damage in these area".

1.5 Community-Based Adaptation

Within the adaptation sphere, CBA responses have become increasingly prevalent owing to the realisation amongst the international community that traditional, top-down initiatives have not generally been successful in providing effective and sustained real benefits to vulnerable communities (Dean, Green and Nunn 2016; McNamara and Buggy 2016). CBA interventions are defined as those that assist communities in adapting to climate change and as such must account for the impacts from climate change, either predicted or experienced, outside of what is classified as regular climate variability (Reid and Schipper 2014). CBA initiatives aim to

address root causes of vulnerability within communities (Ayers and Forsyth 2009), and utilise the wealth of knowledge and experiences of communities in dealing with the localised impacts of climate change (Forsyth 2013; Reid 2016). Implicit in this definition, CBA goes further than just being implemented at the community level; rather, it is driven by the community itself through self-identified processes. Nonetheless, initiatives are still implemented as top-down approaches under the pretext of being community-based, in that the community is consulted yet initiatives are still driven by outside priorities and objectives (Reid and Schipper 2014).

There are a number of challenges and barriers to the success of CBA. One key challenge is that, by definition, CBA is a localised strategy consisting of specific activities often within a narrow geographic area. This makes it difficult to replicate and learn lessons from these projects to apply more widely across temporal and spatial scales (Forsyth 2013; Pelling 2011; Reid and Schipper 2014). As such there have been increasing moves to understand how best to "scale up" CBA to have greater relevance for people and communities across such temporal and spatial scales (see Reid and Huq 2014). Another major challenge for CBA, and a barrier to its success, is the limited number of project evaluations being done within the academic literature (for some exceptions see Dumaru 2010; Remling and Veitayaki 2016; Simane and Zaitchik 2014). Most project evaluations from implementing agencies and donor organisations of CBA occur within the grey literature leaving a gap for more critical academic work that could add value in terms of contributing insights into successful CBA. Further, there is a disparity between critical academic literature on CBA and what is being implemented on-the-ground. For example, many projects announced as CBA are not adequately participatory and are often not being sustained past the project lifecycle, which are well-documented assertions in the academic literature (Leventon et al 2014; Nunn 2009; Simane and Zaitchik 2014).

1.6 Research Question, Aims and Objectives

Climate change adaptation projects are increasingly being implemented in PICs, yet there exists a dearth of analysis to whether they have been successful in achieving their aims. Therefore, the overarching premise of this thesis is to assess the effectiveness of such projects implemented in rural Pacific Island communities. To achieve this, the following research question, research aims, and objectives drive this research, each linked to separate chapters as illustrated in Figure 3 below.

Research question: How, if at all, are community-based adaptation projects reducing people's vulnerability to climate change impacts?

Research aims and corresponding objectives:

Aim 1: To identify the barriers for effective community-based climate change adaptation interventions globally, based on a review of grey literature from implementing bodies (linked to Chapter 2.0).

Objective 1a: Summarise existing CBA initiatives globally using an online search of publicly available CBA project documentation.

Objective 1b: Synthesise key barriers to CBA, as identified within the grey literature.

Objective 1c: Discuss the implications of barriers identified for successful CBA.

Aim 2: Explore the effectiveness of climate change adaptation projects implemented in rural coastal Pacific Island communities in reducing the vulnerability of target communities, across the tripartite of responses: retreat, protect, and accommodate (linked to Chapter 3.0, 4.0, 5.0, and 6.0)

Objective 2a: Evaluate the outcomes of projects from community perspectives in terms of project appropriateness, efficacy, equity, impact, and sustainability;

Objective 2b: Identify dominant barriers to achieving successful adaptation in case study sites.

Objective 2c: Identify if projects have successfully reduced the vulnerability of target communities, and why/why not;

Aim 3: Provide recommendations and insights into both the effectiveness of climate change adaptation in reducing the vulnerability of rural coastal communities (linked to Chapter 6.0)

Objective 3a: Drawing on the case studies, elucidate what factors contributed to the success, or failure, of planned adaptation;

Objective 3b: Explore opportunities through which adaptation can be targeted to improve the outcomes for rural coastal communities in Pacific Islands

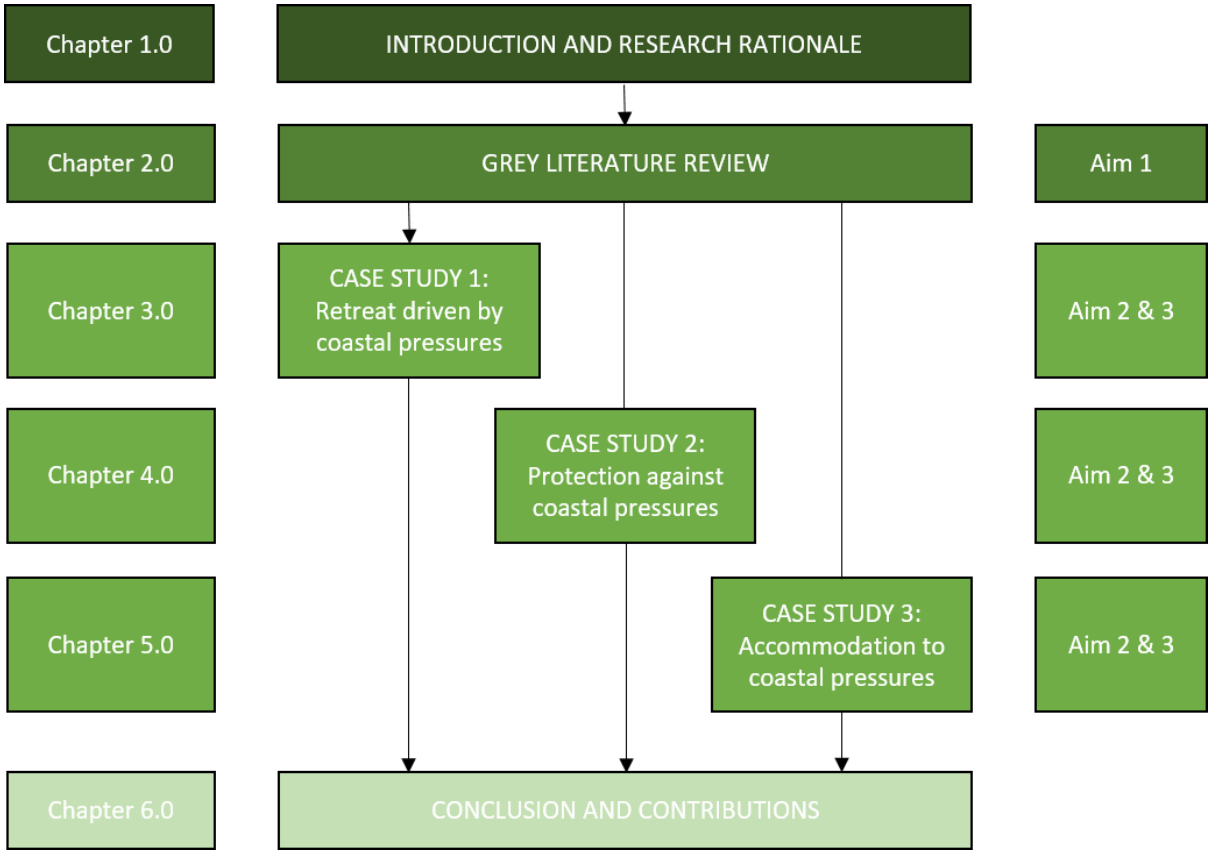


Figure 3: Overview of thesis structure including chapters and associated research aims.

1.7 Research Framing and Methodology

This section will detail the research design and methods employed in this thesis and justification for why these approaches were undertaken. Since the succeeding chapters (2.0, 3.0, 4.0, and 5.0) have been written in manuscript form for publication, each containing an independent methods section, the specific methods will not be detailed here. Rather, this section justifies the methods chosen. The dominant considerations that will be discussed are: undertaking qualitative research in a cross-cultural setting in Pacific Islands, the choice of a multi-case study approach, the use of focus groups (FGs) and interviews as the primary method, and the process of reflexivity in research.

1.7.1 Undertaking cross-cultural research in a Pacific Island context

As an Anglo Australian undertaking research in a Pacific Island context, consideration must be given to the cross-cultural nature of this research. In a Pacific context, this is especially important due to the historical and political conditions which may influence power, or elicit subjectivity and bias from both the researcher and participants. As such, it is important that

consideration be given to methodological and ethical challenges that may arise to ensure that research is undertaken in the most respectful way to ensure that 'no harm' is done (Fa'avae, Jones and Manu'atu 2016). As Vaioleti (2006: 29) states "if researching ethically is about respecting human dignity, then it is critical that the process is culturally appropriate for the participants. It is imperative that Pacific research ethics (protocols) emerge from Pacific world views in order to keep synergy with the methodology and to protect the integrity of participants as Pacific cultural beings".

As this research is based in the Pacific, key protocols to engage appropriately and respectively have been used and are seen as essential to the process of undertaking this research. These are drawn from the 'talanoa' research approach which has its roots in Tonga but can be applied and followed when researching in the broader Pacific region (Fa'avae, Jones and Manu'atu 2016). The genesis of talanoa is: "Tala means to inform, tell, relate and command, as well as to ask or apply. Noa means of any kind, ordinary, nothing in particular, purely imaginary or void." (Vaioleti 2006: 23). Talanoa has been described as a "conversation, a talk, an exchange of ideas or thinking' and as chatting, yarning and telling stories" (Vaioleti 2006: 23).

Key principles drawn from and described by Vaioleti (2006) have been applied while undertaking research during this thesis. These are important as the ways of engaging, learning and interacting in Pacific Island contexts are vastly different from other regions in the world, especially as a western researcher. These principles defined by Vaioleti (2006) are: 1) 'Faka'apa'apa', being respectful, humble and considerate. For example, ensuring that the cultural context is understood and subsequent procedures such as appropriate dress code, and body language are locally and culturally appropriate; 2) 'Anga Lelei', tolerant, generous, kind, helpful, calm and dignified. For example, a researcher must understand the participants' situation, and daily lives and routine, and work around them to account for this; 3) 'Mateuteu', well prepared, hardworking, culturally versed, professional and responsive. For example, as a researcher one must be prepared for, and move freely with, disruptions that may arise while undertaking research; 4) 'Poto He Anga', knowing what to do and doing it well, cultured. For example, ensuring confidentiality, transparency and respect when undertaking research, and; 5) ''Ofa Fe'unga', showing appropriate compassion, empathy, aroha and love for the context.

For example, this principle puts onus on the researcher to ensure that no negative consequences arise from undertaking research with Pacific Islanders.

1.7.2 Case Studies

Owing to the context and aims of this thesis, case studies were chosen as the primary method of data collection as they allow for an in-depth exploration of a unit of analysis. Case studies are especially suited to adaptation research as they allow for in depth local scale exploration at the point at which climate impacts are felt, and where adaptation is implemented. A multi-case study approach was chosen as this approach allows for the analysis of multiple units (or cases) to be undertaken which can then give insight into the wider context in which the case studies exist. In this thesis, three case studies of community level planned adaptation in different Pacific Island communities are used to give insight into the wider context of planned CBAs in PICs. As shown in Figure 4 below, qualitative research methods including FGs, observation, and informal interviews with local communities were undertaken within these case study locations.

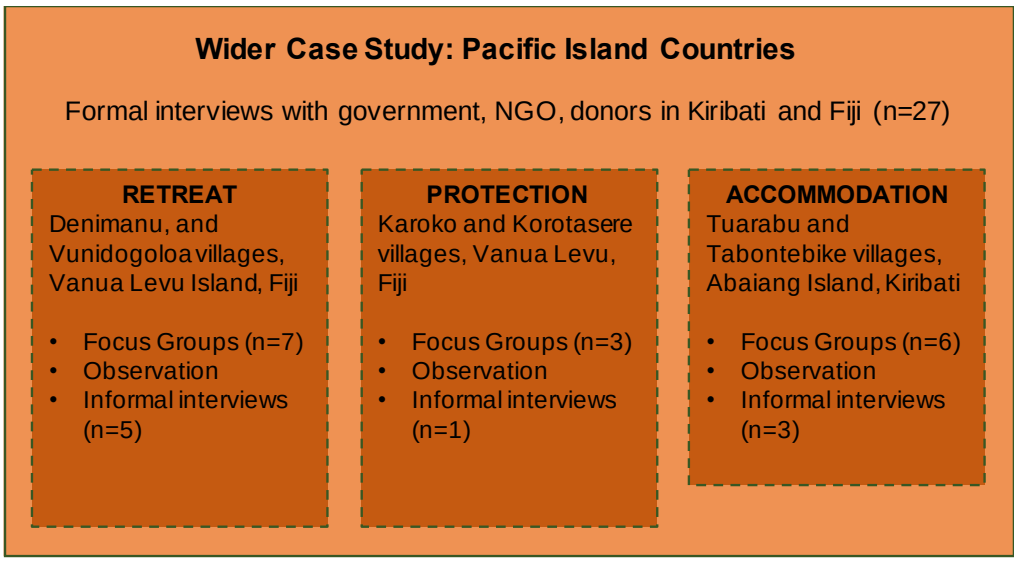


Figure 4: Case study design. Source: adapted from MacMahon (2017)

Focus Groups

FGs were undertaken as the primary research method and comprise the bulk of data collected. FGs are defined as "a qualitative method with the primary aim of describing and understanding perceptions, interpretations, and beliefs of a select population to gain understanding of a particular issue from the perspective of the group's participants' " (Hsieh and Shannon 2005:

65). Due to the nature of this research, FGs were chosen as the primary method of research as they are a useful tool to uncover a rich understanding of perceptions, thoughts, impressions and feelings of a group of people, provided from their own perspective in their own words (Stewart, Shamdasani and Rook 2007). FGs are also especially useful when dealing with sensitive issues, and to give a voice to marginalised groups of people (Hsieh and Shannon 2005), both of which are relevant to this research. Plate 1 below shows images of focus groups being undertaken in case study locations.

Plate 1: FGs in: Tuarabu Men (top left); Tabontebike Women (top right); Vunidogoloa Women (bottom left); Tabontebike Men (bottom right).

A FG guide, or questioning route, was used as the foundation for FGs. This is defined "a sequence of questions in complete conversational sentences" (Krueger and Casey 2009: 38). There are a few basic principles that need to be accounted for when designing a FG to ensure the best responses are elicited. These are described by Krueger and Casey (2009) as: evoking conversation, use words participants would normally use (ie. avoid academic jargon), are easy to say, clear, short, open ended (most often), one-dimensional, and include clear, well thought-out directions (Krueger and Casey 2009). A questioning route for FGs can be found in current form in Appendix 2. This was the preferred method as it ensures specific information and

questions are answered which are pertinent to the research questions, and allows for a deeper analysis of results while also allowing the discussions to be free flowing (Krueger and Casey 2009). Acknowledging the importance of this guide, great flexibility was used when implementing this in the field due to the differing contexts and local languages in which the case studies were situated.

Interviews

Interviews were additionally undertaken with a range of stakeholders in (or overseeing) case study sites including government officials, representatives from NGOs and donor organisations, and local community members. Interviews are designed to understand the lived experiences of the interviewee and capture their perspectives, thoughts, feelings and opinions in their own words about a specific topic that is under investigation. They are defined as "face-to-face verbal interchange in which one person, the interviewer, attempts to elicit information or expressions of opinion or belief from another person or persons" (Maccoby and Maccoby, 1954: 499). These interviews were undertaken to add rich data and compliment the information from FGs. Interviews undertaken in this research were in a range of formats. Formal semi structured interviews were undertaken with government officials and NGO, and donor staff. Semi-structured interviews allow for specific questions to be defined and addressed while also allowing for more flow in interview style to allow ad hoc questions to be asked if determined necessary. Informal interviews were primarily undertaken with community members to clarify information or deepen insights and findings that evolved out of FGs.

Case study selection

The following set of criteria were used to identify the case study sites that would be used in this research:

1. A rural community situated in a PIC, the geographical region of interest for this research.
2. The community had a climate change adaptation project implemented in the community.
3. The project was implemented between two to five years prior to fieldwork to ensure community members' experiences were still recalled and to gauge an appropriate level of success.

4. The project fitted into one of the three adaptation responses: retreat, protect, and accommodate, to have a frame of analysis and ensure the breadth of adaptation responses are involved.
5. The community was open and willing to be involved in the research.

Table 1: Overview of case study locations, including project focus, number of sites, locations, year project was implemented, number of FGs, number of interviews, and participant numbers.

Adaptation Type	Retreat		Protect		Accommodate	
Project Focus	Planned village relocation		Construction of seawalls		Enhancing and diversifying food security	
No. Sites	2		2		2	
Locations	Vunidogoloa, Vanua Levu, Fiji	Denimanu, Vanua Levu, Fiji	Karoko, Vanua Levu, Fiji	Korotasere, Vanua Levu, Fiji	Tabontebike, Abaiang Island, Kiribati	Tuarabu, Abaiang Island, Kiribati
Project Year	2014	2013	2015	2015	2014	2014
FGs	4 (n=30)	3 (n=24)	2 (n=21)	1 (n=8)	3 (n=30)	3 (n=56)
Interviews (formal and informal)	n= 5		n= 2		n= 29	
Participants	n= 59		n= 31		n=115	
Total Participants	n= 205					

Each of the three case studies had two communities in which the adaptation project was implemented. This resulted in a total of six communities. These communities were Vunidogoloa and Denimanu (retreat); Karoko and Korotasere (protection); and Tuarabu and Tabontebike (accommodation). Each of these case study sites will be detailed below. Details of the case study location, project focus, year of project implementation, number of FGs, and total participants involved in the research from each case study site are detailed in Table 1.

Vanua Levu, Fiji

Fiji is an archipelago situated in the South West Pacific Ocean and home to 330 islands, with Vanua Levu the second largest (Viti Levu being the largest). Approximately 15% of the total 900 000 population live on Vanua Levu. In total, roughly 45% of inhabitants of Fiji live in rural areas,

relying on a subsistence lifestyle involving both terrestrial and marine resources. The number of people living in rural areas has declined from 70% in 1960 (World Bank 2018). Two case study sites (protection and retreat) were situated on (or off the coast) of Vanua Levu Island. These will be detailed below.

Vunidogoloa and Denimanu (retreat)

The two case study locations for the retreat adaptation are both located on or off the coast of Vanua Levu Island in Fiji (see Figure 5). It is noteworthy that these two case studies exhibit some common contrasts within the range of relocations. First is the portion of the village relocated, with one case study having a complete village relocation and the other a partial village relocation. Second are the impacts that drove the relocation. Vunidogoloa residents describe how relocation was driven by slow-onset climate change impacts while Denimanu is an example of sudden-onset impacts, in this case driven by cyclonic storm surge activity and shoreline erosion exacerbated by sea-level rise. Both these planned relocations were supported by the Fiji Government through both its Ministry of Rural and Maritime Development and its National Disaster Management Office.

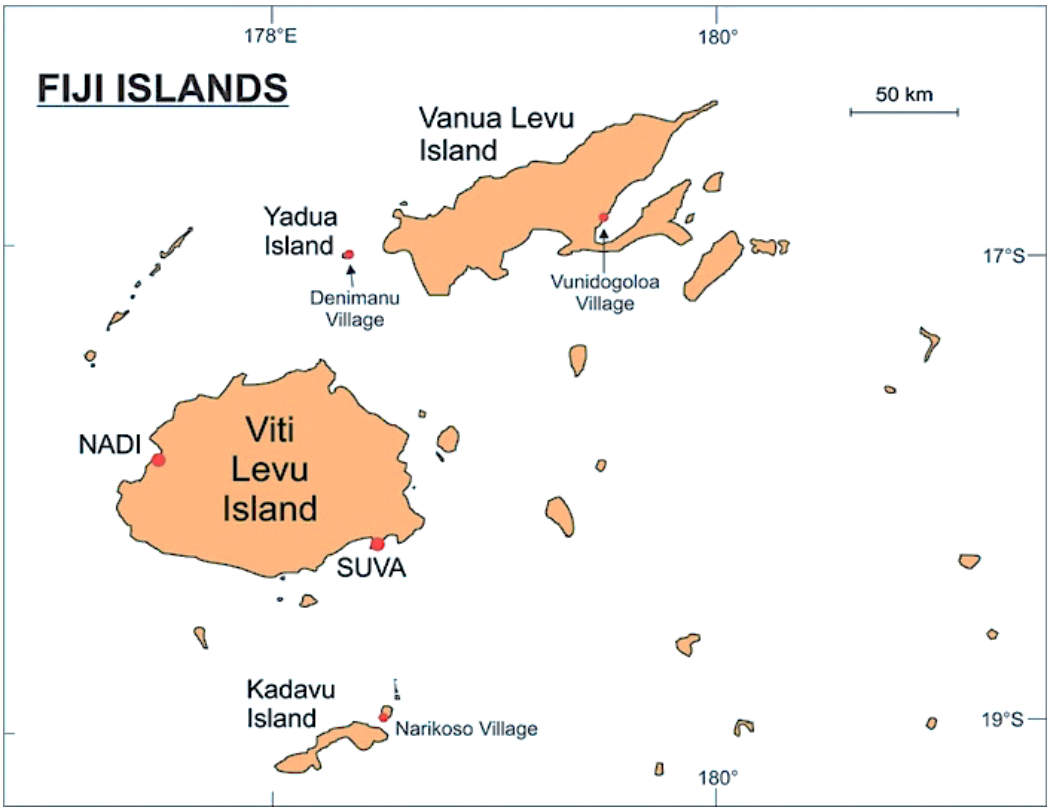


Figure 5: Map of Fiji showing the two retreat case study sites (Vunidogoloa and Denimanu villages).

Vunidogoloa is located approximately a two-hour bus ride from the nearest town of Savusavu on Vanua Levu Island. It has a population of 153. The people rely heavily on fishing and subsistence agriculture for their livelihoods, as well as cash from market sales of fish and crop surpluses and locally-made crafts. Vunidogoloa has been labeled as the first climate-induced relocation undertaken by the Fiji Government (Charan, Kaur and Singh 2017; Witschge 2018; Farbotko et al 2018). Vunidogoloa presents a case of an entire village relocation. In its former location, the village was increasingly experiencing slow-onset climate impacts including tidal inundation, coastal erosion and saltwater intrusion. This impacted on infrastructure and made growing food crops in the original village increasingly difficult. In response, the village was relocated from the old village location on the coast, to the new village location 1.5-2 km inland adjoining the main road. This relocation occurred on land belonging to the same *mataqali* (family land owning unit). The relocation included housing, as well as livelihood provisions including fish ponds, pineapple plantations, and cattle.

Denimanu village is on Yadua Island, situated off the western extremity of Vanua Levu Island. The village is accessible only by boat. Denimanu is the only village today on Yadua Island with a total population of approximately 170 people. The village also relies heavily on subsistence fishing and crop agriculture with surpluses sold for income. The planned relocation that took place in Denimanu was a partial relocation, with approximately half (19 households) of the village relocated. The houses of the affected people were destroyed by storm surges from Cyclone Evan in December 2012. The 19 affected dwellings were located at the front of the village, closest to the coastline. New houses were built approximately 500 m away on a slope of the hill in rows. The new houses were completed in mid–late 2013. This new location was chosen because the boundaries of the village and the encroaching shoreline made it impossible to rebuild the houses in the location they were previously as the land had been lost. There are two *mataqali* in Denimanu. A consultation was undertaken between the government and these mataqali to agree on the new location. A review of this relocation was provided by Martin, Nunn, Leon and Tindale 2018).

Karoko and Korotasere (protection)

The case study sites for the protection project are two villages, Karoko and Korotasere, located on Vanua Levu Island (see Figure 6). Like most rural areas in Fiji, both villages are coastal and largely subsistence-based relying heavily on marine and terrestrial resources for their livelihoods. Karoko is a just under 100km distance from the nearest town centre, Savusavu while Korotasere is situated 50km from Savusavu. A bus services both villages along the only road serving that area.

As both villages have been facing impacts from flooding, there was a desire within the villages for some form of coastal protection measure. In Korotasere, a seawall was specifically requested by the village. In Karoko, while there was a desire for some type of coastal protection, a seawall was one option discussed in the village alongside relocation. Despite a lack of consensus, the implementation of the seawall was welcomed by the village.

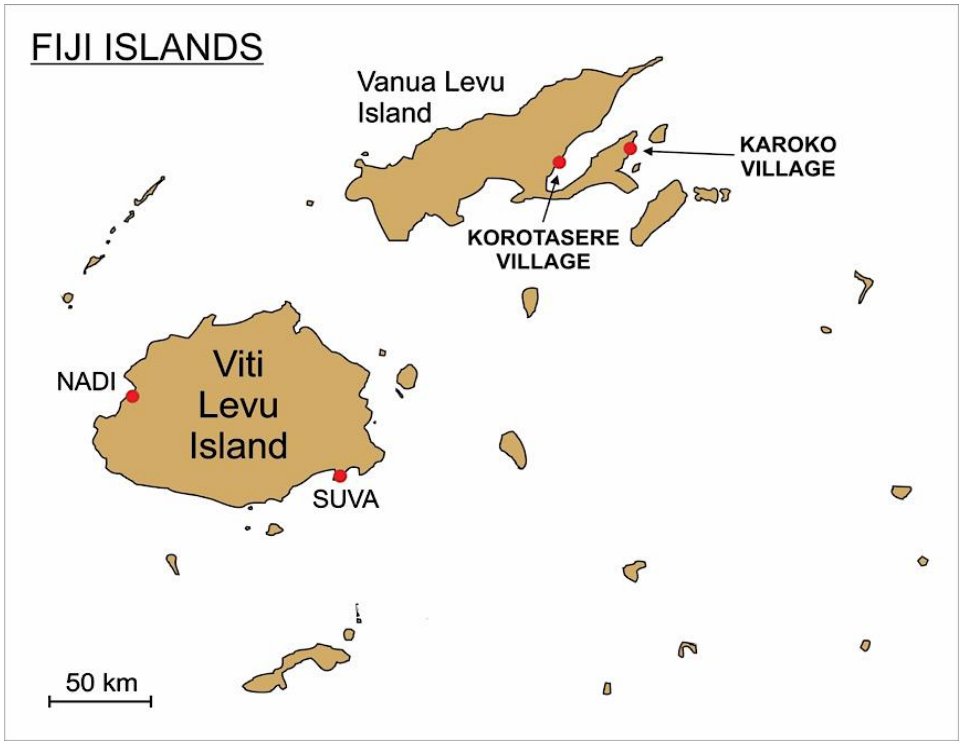


Figure 6: Map of Fiji showing the two protection case study sites (Karoko and Korotasere villages).

Both seawalls were funded through The United States Agency for International Development (USAID) under the Coastal Community Adaptation Project (C-CAP) and implemented in both communities at the end of 2015. In total, the project was implemented in numerous

communities across nine countries throughout the Pacific region, in consultation with respective governments and local partners. The actual construction was undertaken by a local contractor. One of the project's primary objectives is to implement infrastructure adaptations to withstand climate change impacts and increase community resilience. In both Karoko and Korotasere, this resulted in the construction of seawalls in the communities.

Tuarabu and Tabontebike, Abaiang Island, Kiribati (accommodation)

Kiribati is an island nation situated in the Pacific Ocean straddling the equator and the International Date Line. Kiribati comprises 32 atolls and reef islands and one raised limestone Island, with the total land area just above 800km^2. The average height of islands in Kiribati above sea-level is roughly two metres. With a total population of over 110,000, this varies across islands from a mere 20 on Kanton to 56,324 on the capital, South Tarawa (National Statistics Office 2016). Abaiang is the closest island to the capital, South Tarawa, and is situated one-degree north of the equator. To access Abaiang it takes 4 hours via a local ferry that services the island a few times a week, or two hours via a private speed boat. Flights through Air Kiribati also service the island a few times a week. It is the fourth most populous island in Kiribati with 5,568 inhabitants. There are 18 villages that comprise Abaiang, two of which are located on islets and as such are only accessible via boat. The other 16 villages are spread along the 37km stretch of land with a width less than 1km, and a total land area of 17km^2.

Two villages were chosen as case study sites on Abaiang: Tabontebike and Tuarabu, as shown in Figure 7. These villages were chosen through consultation with the local agricultural assistant on Abaiang. Both villages have been recent recipients of the same food security enhancement project. Tabontebike is located at the southern terminus of Abaiang, while Tuarabu is roughly in the middle of the island. The population at the time of research of each village was 255 and 537 respectively.

The food security project was implemented in 2014 with the aim of enhancing and diversifying food security for local communities and implemented in both case study locations. This project was part of a wider regional project, 'Enhanced climate change resilient of food production systems in PICs and Territories', and implemented in six countries across the Pacific Region. In Kiribati, the project was originally implemented in three villages, all on Abaiang (two of which

are the focus of this research). The aim of the project was to enhance the resilience of local food systems through providing resources such as seedlings, animals, and infrastructure, as well as training on compost, mulching, and raised beds farming methods.

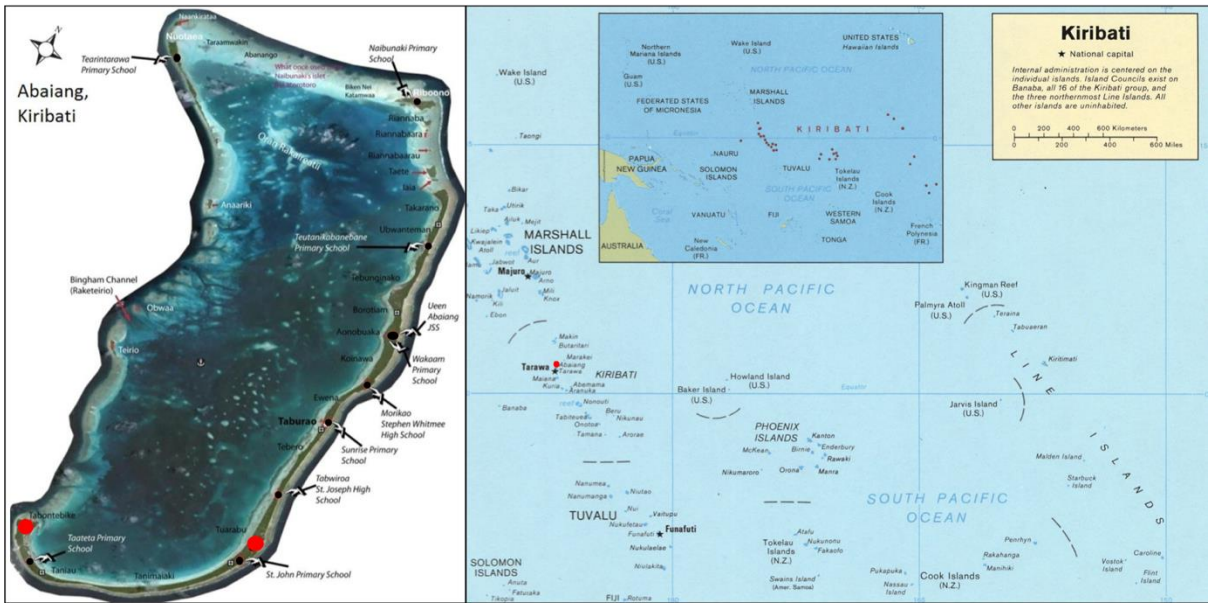


Figure 7: Location of accommodation case studies on Abaiang Island, Kiribati

1.8 Thesis Overview and Structure

The impacts from climate change are reaching all corners of the world. Owing to the inequity in the cause and distribution of climate change, countries in the Global South are most affected despite contributing the least in terms of GHG emissions (Althor, Watson, and Fuller 2016). As such, significant adaptation efforts have been focussed in the Global South. As the community level is where climate impacts are both felt and therefore where adaptation efforts take place, there has been growing interest in CBA, driven by local needs and values. CBA is largely implemented and funded by a range of stakeholders including NGOs, international NGOs (INGOs), and bilateral and multilateral organisations. Therefore, reports detailing the outcomes of projects undertaken by such organisations hold a mass of knowledge and lessons which has not yet been explored within the academic literature (Spires, Shackleton, and Cundill 2014). Chapter 2. 0 contributes to this gap by reviewing the publicly available grey literature (consisting of such aforementioned reports). This chapter was published in the journal *Local Environment* in January 2019. The primary aim of Chapter 2.0 is to gain a snapshot of CBA implemented in the Global South and identify the dominant barriers experienced when

implementing such. A number of significant findings are identified, namely that there is a need for greater project evaluations from the community, a perspective oft-lacking in the literature.

The finding from Chapter 2.0 detailing the need for community adaptation project evaluation from community perspectives gives rise to, and leads into the succeeding Chapter 3.0, Chapter 4.0, and Chapter 5.0. These three chapters present in depth case studies into the appropriateness, efficacy, equity, impact, and sustainability of adaptation projects implemented in rural coastal Pacific Island communities. Each of the case studies deals with an adaptation project across the tripartite of responses: retreat, protect, and accommodate. This framing was chosen to ensure the breadth of adaptation responses were explored, given the diversity of both impacts and contextual factors such as local scale vulnerabilities, island geography, and available resources which evoke the need for different adaptation responses. These case study chapters contribute to the gap in the literature identifying an explicit need for greater empirical detailed case studies of community adaptation (Remling and Veitayaki 2016), especially those in PICs who are some of the most vulnerable in the world.

The first case study is of planned relocation (retreat) of two communities on Vanua Levu Island, Fiji, and is presented in Chapter 3.0. This chapter was published in the journal *Social Sciences* in April 2019. This case study is of significance owing to the over 80 communities that are currently earmarked for future relocation by the Fijian Government (Republic of Fiji 2014), with numerous more in threat throughout the Pacific region alone. As such, providing rich case study material detailing the livelihood outcomes and implications of relocation for affected communities is vital. This is of increased significance as the outcomes from previous resettlements and relocations from activities such as development, mining, and tourism, amongst other drivers, have often proved disastrous for those affected (see Appendix 1).

A seawall (protection) project is the second case study and is presented in Chapter 4.0. This chapter was written as a book chapter for the book *Managing Climate Change Adaptation in the Pacific Region* and is currently in press. Seawalls are a frequently implemented adaptation measure with the aim to alleviate coastal pressures associated with sea-level rise including tidal inundation and flooding, and increased storm surge activity. Despite their commonality, significant questions have been raised about their efficacy and sustainability, especially in small

island rural settings, with numerous documented failings (Dean, Green and Nunn 2016; Karlsson and Hovelsrud 2015; Klöck and Nunn 2019; Nunn 2009). Chapter 4.0 looks beyond only the efficacy and sustainability of the adaption project and explores the maladaptive potential of seawalls. This is done through exploration of the implications on lives and livelihoods in two rural coastal communities in Vanua Levu Island Fiji who were recipients of a seawall project.

Chapter 5.0 presents the third and final case study of a food security project (accommodation) implemented on Abaiang Island, Kiribati. This chapter was written as a manuscript and is currently in review with *Regional Environmental Change*. The subject of this case study was an externally driven regional project implemented in numerous communities across six countries throughout the Pacific, representing a common model of adaptation implementation. This project was aimed at enhancing food security and resilience of local communities in the face of increased climate variation, something creating high levels of vulnerability for many Pacific Island communities (Barnet 2011). Chapter 5.0 provides important insight and context into the outcomes of such regionally driven projects and asks important questions of whether such models are effective and raises considerations of who currently is and who should be establishing adaptation goals and directions if they are to be truly sustainable.

Chapter 6.0 summarises the findings from the preceding chapters, identifying the main conclusions and contributions of this thesis relevant to the wider literature. This chapter further summarises the main research limitations experienced throughout the entirety of this research and documents potential future research directions.

2.0 Grey Literature Review: What are the barriers to successful community-based climate change adaptation?

"Saving our planet, lifting people out of poverty, advancing economic growth… these are one and the same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security, and women's empowerment. Solutions to one problem must be solutions for all."

Ban Ki-moon –

Place of chapter in thesis

This chapter serves as the first results chapter of this thesis, as shown in Figure 8. It answers research aims and objectives 1:

Aim 1: To identify the barriers for effective community-based climate change adaptation interventions globally, based on a review of grey literature from implementing bodies (linked to Chapter 2.0).

> Objective 1a: Summarise existing CBA initiatives globally using an online search of publicly available CBA project documentation.
>
> Objective 1b: Synthesise key barriers to CBA, as identified within the grey literature.
>
> Objective 1c: Discuss the implications of barriers identified for successful CBA.

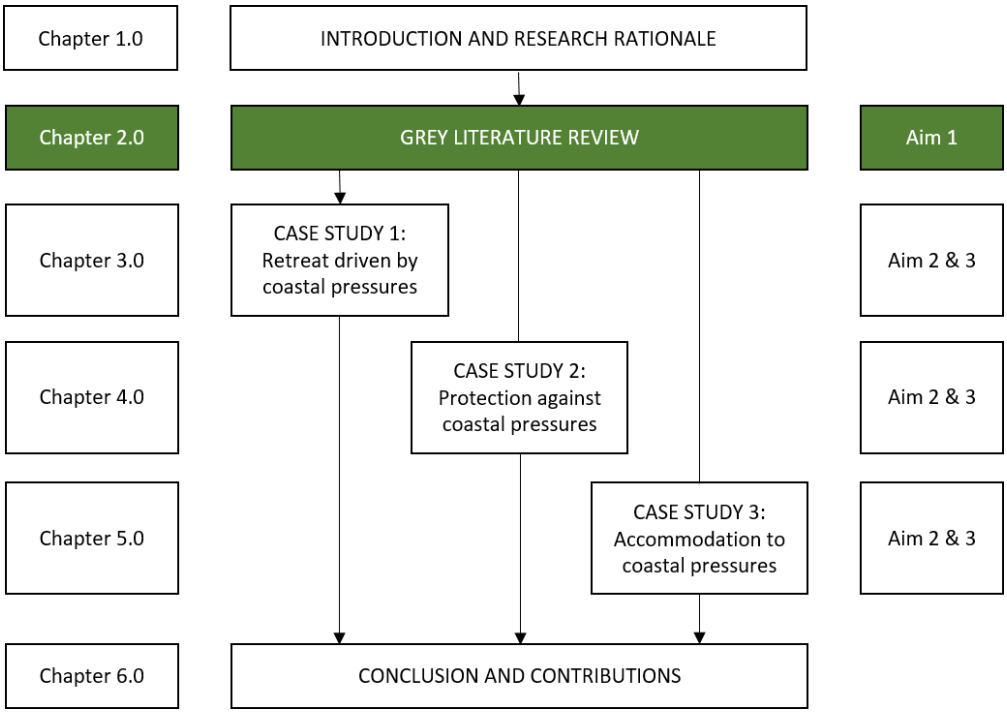


Figure 8: The place of chapter 2.0 in thesis.

This chapter has been written as a manuscript and published in the journal, *Local Environment*: – Piggott-McKellar, A.E., McNamara, K.E., Nunn, P.D. and Watson, J.E.M. (2019). What are the barriers to successful community-based climate change adaptation? A review of grey literature. *Local Environment*, 24(4), 374–390. DOI: 10.1080/13549839.2019.1580688

Statement of Authorship for this Chapter

The conception and design of this chapter was undertaken in part by the candidate (50%) and in part by Karen McNamara (50%). The analysis and interpretation was undertaken primarily by the candidate (90%) with guidance and assistance from Karen McNamara (10%). This chapter was written solely by the candidate (100%) with editing done by the candidate (20%), Karen E. McNamara (30%), Patrick D. Nunn (30%), and James E. Watson (20%).

Abstract

Across the Global South, CBA projects are increasingly being implemented in an effort to respond effectively and sustainably to the impacts of climate change, with a particular focus on people's livelihoods. Despite an increase in the number of CBA projects being implemented, detailed analysis and evaluation of their efficacy and the barriers faced in achieving successful outcomes is lacking. This study draws on an analysis of grey literature (i.e. project and donor reports) to explore the barriers faced in achieving effective CBA. An extensive global search of online project evaluations yielded 25 documents comprising 69 projects from which this analysis is based. This paper first presents an overview of the 69 projects and highlights any trends. Second, this paper describes the barriers to CBA according to three broad themes: socio-political, resource, and physical systems and processes. Following this is a discussion of the most prevalent barriers: cognitive and behavioural, financial, and human resources. Third, this paper discusses the key findings elucidated from this review. This includes the need for greater sharing of project reports and findings so lessons can be learned across spatial and temporal scales, and the disparity between critical academic literature on CBA and what is implemented in practice.

2.1 Introduction

The impacts of climate change are already being experienced across all regions of the world (Scheffers et al 2016). Even if GHG emissions reductions are drastic in the coming years, the impacts of climate change will continue unfettered in future decades given the impact of climate inertia (Betzold 2015; IPCC 2014c; Spires, Shackleton and Cundill 2014). These climatic changes include the frequency and intensity of extreme weather events, changes in precipitation patterns, sea-level rise, increased temperatures and ocean acidification (Voccia 2012). Countries in the Global South in particular will bear the brunt of the most adverse effects of these impacts (Althor, Watson and Fuller 2016; Dasgupta et al 2011; Narain, Margulis and Essam 2011), due to a raft of reasons that includes not only heightened exposure and susceptibility but also constrained adaptive capacities, contributing to overall exacerbated vulnerability. Such vulnerability can be caused by a reliance on climate sensitive sectors (e.g. fisheries and agriculture), low incomes, insufficient infrastructure, high levels of population growth, limited access to food and water security, constrained health and education systems, poor access to power and decision making, and geographic and historical factors (Ayers and

Forsyth 2009; Heltberg, Siegel and Jorgensen 2009; Jackson, McNamara and Witt 2017). Due to the heightened vulnerability of countries in the Global South to the impacts of climate change, this study focuses its attention on such countries.

Given the challenges and risks posed by climate change, adaptation has emerged as a critical field of research and practice. Adaptation to climate change is defined as "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities" (IPCC 2014a: 1758) or put simply, adaptation is "managing the unavoidable" (Weir, Dovey and Orcherton 2016: 1020). Adaptation responses can be: anticipatory in that they take place prior to climate change impacts being observed, something also described as proactive adaptation; autonomous in that they are not conscious but rather spontaneous or reactive intuitive responses; or planned in that they are a result of a decision to adapt to imminent or experienced climatic changes (IPCC 2014b). The role of adaptation in international and regional climate change discussions is exemplified by the Paris Agreement, ratified in November 2016, which places great importance on adaptation in the face of climate change, taking into account the urgent and immediate needs of countries in the Global South (United Nations 2015). This is of significance as the Paris Agreement is widely regarded as a turning point for global collaboration in tackling climate change with, at the time of writing, 186 parties having ratified the agreement (United Nations 2019).

2.1.1 Community-based adaptation

Within the adaptation sphere, CBA responses have become increasingly prevalent owing to the realisation amongst the international community that traditional, top down initiatives have not generally been successful in providing effective and sustained real benefits to vulnerable communities (Dean, Green and Nunn 2016; McNamara and Buggy 2016). CBA interventions are defined as those that assist communities in adapting to climate change and as such must account for the impacts from climate change, either predicted or experienced, outside of what is classified as regular climate variability (Reid and Schipper 2014).

By definition CBA is seen as "a community-led process, based on communities' priorities, needs, knowledge and capacities, which should empower people to plan for and cope with the

impacts of climate change" (Reid et al 2009: 13). CBA initiatives aim to address root causes of vulnerability within communities (Ayers and Forsyth 2009), and utilise the wealth of knowledge and experiences of communities in dealing with the localised impacts of climate change (Forsyth 2013; Reid 2016). Implicit in this definition, CBA must go further than just being implemented at the community level; rather, it must be driven by the community itself through self-identified processes. Nonetheless, initiatives are still implemented as top-down approaches under the pretext of being community based, in that the community is consulted yet initiatives are still driven by outside priorities and objectives (Reid and Schipper 2014).

The term "community-based adaptation" was coined in 2006 (Huq and Reid 2007) although the principles associated with "community-based" or "bottom-up" approaches are not new nor unique. Approaches at this scale and of this ilk have a long lineage, and are employed and researched in other areas such as disaster risk management (Liu et al 2016; Stone et al 2014), natural resource management (Measham and Lumbasi 2013; Mountjoy, Seekamp, Davenport and Whiles 2013; Mountjoy et al 2016), and tourism (Ruiz-Ballesteros 2011; Sebele 2010). While reducing vulnerability to direct climate threats is essential, CBA looks to go beyond this to enable communities to make decisions about their livelihoods within a changing climate as well as address the underlying social, cultural and political environment and vulnerabilities that may inhibit this (Berger and Ensor 2014). As such, CBA efforts employ an array of activities including: livelihood resilience (such as income diversification and agricultural technologies); disaster risk reduction; capacity strengthening of government institutions and local civil society; and advocacy and social mobilisation (Girot, Ehrhart and Oglethorpe 2012).

A key concept to consider when examining CBA relates to the term "community". Of note is the assumption that "community" can represent a cohesive, unified, and homogenous group of people (Buggy and McNamara 2016; Yates 2014). Yet, this assumption can be misleading given that communities contain both individuals and groups of people that have different socio-political characteristics including varying levels of access to and control over services (such as education and health care), resources, decision making, and political influence, among others. This results in some people, or groups of people, within communities being more marginalised and vulnerable than others (Arora-Jonsson 2011; Berger and Ensor 2014). A risk presents itself if communities are not seen in reference to these existing characteristics,

resulting in the reinforcement and exacerbation of existing inequalities and levels of marginalisation (Buggy and McNamara 2016). These concerns surrounding the misleading nature of the term community have resulted in some to posit reconsidering the use of the term "community-based" and instead opt for more honest and clear labels such as "people-centered" (Titz, Cannon and Krüger 2018). This is especially important to consider as climate change adversely impacts the most vulnerable groups and adaptation projects should target and benefit these groups (Reid and Schipper 2014). As such, CBA initiatives must try and see beyond the assumption that communities are a cohesive, united group to one of heterogeneity and nuanced socio-political characteristics (Yates 2014). In much the same vein, it is essential for effective interventions that not all communities are regarded as the same in terms of their adaptive capacities and coping abilities, something that can be measured to a degree by studying their peripherality (Nunn et al 2014; McNamara et al 2018b; Nunn and Kumar 2018).

2.1.2 Barriers to community-based adaptation

Barriers to climate change adaptation are defined as "factors that make it harder to plan and implement adaptation actions or that restrict options" (IPCC 2014a: 1758). They are obstacles that can stop, delay or divert the adaptation process away from its intended objectives (Klaus et al 2014; Moser and Ekstrom 2010). It is important to consider that barriers are not seen the same by all actors involved in the adaptation process but rather are representative of the values held by different stakeholders. While a barrier may be perceived as such by one actor, it may not be the case for another, depending on how something is valued (Klaus et al 2014). It is also important to identify that barriers exist in relation to the context in which they are implemented (Klaus et al 2014; Moser and Ekstrom 2010). Barriers have been identified throughout different phases of the adaptation cycle, with Moser and Ekstrom (2010) separating them at the "Understanding phase", the "Planning phase", and the "Managing phase". Within the literature, institutions have been commonly discussed as key barriers (Biesbroek, Klostermann, Termeer and Kabat 2011; 2013; Oberlack 2017), while physiological barriers toward adaptation measures have also been explored (Gifford 2011).

Barriers are different to limits. The key distinguishing feature between the two is that barriers can be overcome, whereas limits cannot. Limits have been defined as a threshold past which an activity or system cannot be maintained (Moser and Ekstrom 2010). While important, this

distinction is not always clear. There are some perceived limits to adaptation that are indeed barriers; such examples include laws and social processes (Adger et al 2009) as these may be overcome with changes in respective perspectives and process. Additionally, if barriers are not understood, accounted for and overcome then they can become limits.

When it comes to CBA, there are a number of challenges and barriers to its success. One key challenge is that, by definition, CBA is a localised strategy consisting of standalone activities often within a narrow geographic focus. This makes it difficult to replicate and learn lessons from these projects to apply more widely across temporal and spatial scales (Forsyth 2013; Pelling 2011; Reid and Schipper 2014). As such there has been increasing moves to understand how best to "scale up" CBA to have greater relevance for people and communities across both temporal and spatial scales (see Reid and Huq 2014). Another major challenge for CBA, and a barrier to its success, is the limited number of project evaluations being done within the academic literature (for some exceptions see Dumaru 2010; Remling and Veitayaki 2016; Simane and Zaitchik 2014). Most project evaluations from implementing agencies and donor organisations of CBA occur within the grey literature leaving a gap for more critical academic work that could add value in terms of contributing insights into successful CBA. Further, there is a disparity between critical academic literature on CBA and what is being implemented on-the-ground. For example, many projects implemented as CBA are not adequately participatory and are often not being sustained past the project lifecycle, which are well-documented assertions in the academic literature (Leventon et al 2014; Simane and Zaitchik 2014).

Spires, Shackleton and Cundill (2014) reviewed the academic literature on CBA barriers to identify key conceptual themes when implementing CBA initiatives. Three barrier themes were identified: social, resource, and physical barriers. Within these themes, knowledge and communication, and organisational and discursive barriers were widespread (Spires, Shackleton and Cundill 2014). Other key barriers to achieving successful CBA identified within the literature include: poor coordination between actors involved, including between and within NGOs, and governments and communities (Berquist, Daniere, and Drummond 2014; Middelbeek, Kolle and Verrest 2014); financial barriers (Spires, Shackleton and Cundill 2014); capacity constraints in terms of staff and technical expertise (Buggy and McNamara 2016; Dumaru 2010); access to appropriate and relevant climate information (Ashley, Zhumanova,

Isaeva, and Dear 2015; Khan et al 2012; Ralph et al 2015); and issues of power and politics that can arise within institutions responsible for implementing activities (Yates 2014).

2.1.3 Study Aims

Despite the increase in CBA initiatives, a dearth of analysis of their efficacy exists in the academic literature (Remling and Veitayaki 2016). With a view toward understanding what impedes planned CBA in a Global South context, this study reviews projects reported solely within the grey literature, consisting of reports and evaluations of CBA projects published publically online and generally without peer-review. It is important to note that CBA here is referred to as planned projects (with defined timeframes, outputs and budgets) rather than unplanned or autonomous CBA activities. Grey literature is focused on as it holds a mass of lessons that exist from on-the-ground practical initiatives that have been implemented but from which limited publically available sharing occurs. Despite this limited public sharing, it is noted that there exists much sharing between personal connections within and across organisations, identified as a significant source of climate change knowledge and information exchange for practitioners (Stott and Huq 2014). Conducting a literature review focussed on the grey literature will add value to similar reviews of academic literature (Spires, Shackleton and Cundill 2014; McNamara and Buggy 2016) to develop an understanding of CBA interventions and barriers faced in the implementation process as well as explore some wider implications for what these barriers can tell us about achieving successful CBA. As such, this study aims to: 1) summarise existing CBA initiatives globally using an online search of publically available CBA project documentation; 2) synthesise key barriers to CBA, as identified within the grey literature; and 3) discuss the implications of barriers identified for successful CBA.

2.2 Method

We used an iterative process comprising three major steps. First, a set of project criteria was established. Second, a search was undertaken to find appropriate CBA projects, as defined by the criteria. Third, a qualitative content analysis using Nvivo 11 software was undertaken to identify themes and storylines related to barriers to CBA, which were then analysed.

2.2.1 Project Criteria

A set of five project criteria was established. First, in identifying relevant grey literature, project documentation must have “community-based” AND “adaptation” in the title or included in the

executive summary, abstract or project description. Second, these CBA projects must have been implemented in the Global South, in alignment with the Spires, Shackleton and Cundill (2014) review. This criterion was also used as countries in the Global South are generally those most exposed and vulnerable to climate change impacts. Third, the timeframe for CBA projects must have been within the last ten years (2006–2016) to keep a relevant scope for the search and subsequent analysis. Fourth, these CBA projects need to have "sufficient" online documentation (reports, summaries etc.) about project outcomes and/or lessons learnt so as to allow for meaningful analysis. The researchers' discretion was used when identifying "sufficient" information and was largely based on the document providing a "lessons learnt" or "project challenges" section. Fifth, the project document had to be available in English.

2.2.2 Document Search

An online search for grey literature on CBA projects was undertaken between September-October 2016. The search focused on international, multilateral and bilateral development organisations and agencies. This search included relevant United Nations (UN) agencies, NGOs, Climate Change Adaptation Funds, bilateral and multilateral aid agencies, and development institutes. The search term ("community-based" AND "adaptation") was used in websites when undertaking searches. In some instances, document searches resulted in thousands of hits. In such cases, the first 100 links were searched. A Google search was also undertaken, with the addition of "project" in the search term ("community-based" AND "adaptation" AND "project") to pick up any projects that may have been missed. The addition of "project" was used to further define and narrow the outputs. The top 200 links were searched.

Searches were subject to variation based on the layout of each website. In some cases, instead of using search terms, links were followed to find projects. Many searches led to other portals and databases by following links. In addition, an email was sent out to the Pacific Island Climate Change and Development Community, facilitated by the United Nations Develop Programme (UNDP), requesting members to provide access to project reports. This was done as the initial scope of the project was to be focused in the Pacific region although, because of difficulty in sourcing a sufficient number of projects, the scope was expanded to a global analysis. In total, over 100 websites were searched (a full list can be found in Table 2) with 25 documents meeting all the above criteria and as such included in the grey literature review.

Table 2: Full list of the websites searched to find CBA project documents.

Multilateral Agencies and Donors (n=21)
United Nations Development Program, United Nations Environment Program, United Nations Framework for Climate Change, World Bank, World Food Program, Food and Agricultural Organization, International Fund for Agricultural Development, Australian Aid (DFAT), US Aid, UK Department for International Development, Irish Aid, Swedish International Development Cooperation Agency, Austrian Development Agency, African Development Bank, Asian Development Bank, GIZ, Secretariat of the Pacific Regional Environment Programme, Taiwan Aid, Chinese Aid, United Nations Educational, Scientific and Cultural Organization, United Nations Children's Fund
Climate Change Adaptation Funding Bodies (n=16)
Adaptation Fund, Adaptation For Smallholder Agricultural Program, Biocarbon Fund, Global Environment Facility, Least Developed Country Fund, Indonesian Climate Change Trust Fund, Green Climate Fund, Global Climate Change Alliance, Millennium Development Goal Fund, Pilot Program For Climate Resilience, Special Climate Adaptation Fund, Strategic Climate Fund, Strategic Priority On Adaptation, Germany's International Climate Initiative, UK's International Climate Fund, Nordic Development Fund
International Non-Governmental Organisations (n=71)
Oxfam International (and a number of country offices including America, Australia, Canada, Great Britain, Hong Kong, India, Ireland, New Zealand, South Africa), CARE International (and a number of country offices including Australia, Canada, India, UK, USA), International Committee of The Red Cross, International Federation of Redcross and Red Crescent Societies, Tearfund, The Nature Conservancy, Amnesty International, World Wildlife Fund, ActionAid International (and a number of country offices including Afghanistan, Australia, Arab region, Bangladesh, Cambodia, China, DRC, Ethiopia, Gambia, Ghana, Greece, India, Haiti, Indonesia, Ireland, Kenya, Liberia, Malawi, Mozambique, Nepal, Nigeria, Pakistan, Palestine, Rwanda, Sierra Leone, Swaziland, South Africa, Tanzania, Thailand, Uganda, UK, USA, Vietnam, Zambia, Zimbabwe), Live and Learn, Caritas International (and a number of country and regional websites including Africa, Europe, Latin America and Caribbean, North America, Australia, New Zealand, Pacific Islands, Papua New Guinea, Samoa, Tonga), International Union for the Conservation of Nature
Research Institutes and Networks (n=13)
Center for International Climate and Environment Research, Climate Change Agriculture and Food Security, Global Framework For Climate Services, International Institute for Environment and Development, Eldis, Adaptation Learning Mechanism, International Development Research Centre, Stockholm Environment Institute, Africa Adapt , The Pacific Community, Caribbean Community Climate Change Centre, Institute for Global Environmental Strategies, United Nations University

The primary reasons for project rejection were: project reports were discussion or technical papers rather than referencing an actual project; presented a personal anecdote or experience in a project and thus not providing sufficient information on the whole of project results; projects were ongoing and consequently did not have a sufficient level of results presented; no or insufficient documentation of project results; duplicate reports from separate websites;

and vulnerability assessments or pilot projects to develop adaptation actions rather than reporting on the actual implementation of them.

2.2.3 Analysis of Projects

Project reports were transferred into Nvivo 11 software and a qualitative content analysis undertaken. Qualitative content analysis allows for themes to be identified that represent similar meanings through examining and interpreting large amounts of text (Hsieh and Shannon 2005). These themes can be both explicit, as stated in the text, or inferred (Hsieh and Shannon 2005). This was identified as the most appropriate approach to understand and group common themes within the grey literature.

The first step involved using a content analysis where the researcher delved into the reports without any framework to dictate which themes would be found, but rather let these emerge from the data (Hsieh and Shannon 2005). The next step involved creating separate categories within each of these themes. The themes and categories generated were then compared against existing literature leading to minor changes to make them relatable. This resulted in different yet comparable findings. This process was deemed appropriate as it allowed themes to flow from the data while at the same time building on existing information to scale up the lessons established from previous research.

2.2.4 Limitations

The online document search encountered limitations. First, the likelihood that reports were missed as searches did not include individual Government websites, small in-country NGOs and community based organisations is evident. These were not included as it would have presented a challenge outside the scope of this research in identifying the vast and extensive number of local groups and government departments at all scales in the Global South that could be responsible for implementing CBA projects. In addition, as only reports in English were used in the analysis it would have created a biased sample size as many local government websites (and subsequent reports) are in other languages. The second limitation relates to the quantity of relevant information that exists within discussion papers and reports within the grey literature. These reports were not included in this analysis as they were not evaluating specific projects. Third, as reports were often written by the organisations that implemented projects, the potential for positive bias is evident with the risk of under-representation of

barriers faced and even the potential failure or maladaptation of projects. Finally, the lack of access to project reports held internally within organisations is a further, significant limitation.

2.3 An overview of projects

Twenty-five documents were identified during the search. Two of these documents presented information on the same project, in which case information was aggregated from both documents. Nine documents described multiple projects within; seven of these documents presented a "lessons learnt" or "project challenges" section with no distinction between each individual project, but rather an overview of all the projects. They did however describe specific details on the implementation of these separate projects. Overall, from the 25 documents, 69 projects were discussed. As such, the following section provides an overview of the 69 projects according to: implementing agency, geographic location, sectoral focus, and climate change impact being addressed (Table 3).

The spread of projects was predominantly in Asia, followed by both Africa and Central and South America, with the Pacific Islands coming in last. The dominant sector that projects focused on was by far agriculture and/or food security. This finding mirrors a study of climate change adaptation projects implemented globally where agriculture was found to dominate as the sectoral focus (McGray, Hammill and Bradley 2007). Further, agriculture was the dominant sectoral focus across geographic regions of Africa (92.3% of all projects in Africa), Asia (68.6%), and South and Central America (53.8%). In the Pacific Islands, both agriculture (50%) and coastal protection (50%) were the main focus. This could be attributed to the geography of Pacific Islands, being highly exposed to sea-level rise and weather events such as cyclones and storm surges, making them particularly susceptible to coastal pressures (Nunn 2009).

Table 3: Overview of projects according to implementing agency, geographic location, sector, and climate change impact being addressed.

Overall variable	Categories	Percent
Implementing agency	Multilateral agency	49.3
	Non-governmental organisation	26.1
	Research institutes/Government agencies	24.6
Geographic location	Asia	50.7
	Africa	18.8
	South/Central America	18.8
	Pacific Islands	11.6
Sector	Food security/agriculture	68.1
	Water security	26.1
	Coastal protection	18.8
	Conservation	15.9
	General livelihood	14.5
	Disaster risk	11.6
Climate change impact being addressed	Changes in rainfall patterns	53.6
	Drought	33.3
	Temperature rise	31.9
	Extreme weather events	30.4
	Sea-level rise	17.4
	Flooding/ tidal inundation	14.5
	Natural disasters	7.2

Changing rainfall patterns was the most common climate change impact that projects were addressing, identified in over half of projects, followed by droughts, a rise in temperatures and extreme weather events. Across geographic location changing rainfall patterns was the primary focus in Africa (61.5% of all projects in Africa), South and Central America (46.2%), and Asia (45.7%), while in the Pacific Islands changing rainfall patterns was of equal focus with extreme weather events (both 87.5%). The focus on extreme weather events in the Pacific Islands was substantially higher than other regions (Africa = 30.8%, Central and South America = 38.5%, Asia = 14.3%). This finding is consistent in that Pacific Island nations experience high levels of exposure to extreme weather events (Nunn 2009), and as such is unsurprising that it has a disproportionately higher focus than in other regions.

The majority of projects (49.3%) identified in the analysis were implemented through a multilateral agency. The average time frame for projects (88% of documents provided a time frame) was 2.9 years with an average yearly budget (48% of documents provided a budget) of approximately US$300,000. It should be noted that the project time could be influenced as projects that are still in progress were not included in this study, thus excluding projects that

are maintained on-the-ground for numerous years. These findings are very similar to a review of implementing partners across the Pacific Islands where the average project timeframe was identified as 3.23 years (McNamara 2013). McNamara (2013) further found the average budget to be ||US$ 1,135,914, which when averaged across the average lifespan (3.23 years) of projects was roughly US$350,000, which is comparable to the US $300,000 identified in this study.

The types of activities implemented in projects varied with each project using a combination of the following activities as presented in Table 4. These activities are: capacity building and training; natural resource management practices; new agriculture techniques; awareness raising; infrastructure; technology; targeting marginalised groups; planning and policy; establishing management groups; livelihood diversification; early warning systems; and financial schemes.

Table 4: A list of the activities implemented in projects, along with a description of each and the percent of projects that used them.

Activity Type	Description	Percent
Capacity building and training	Provides training to stakeholders to teach or improve skills in implementing or managing project activities	67
Natural resource management practices	Implements new practices to manage natural resources (e.g. water, land, protected areas, fisheries etc.)	67
New agricultural techniques	Includes new techniques or methods for agriculture (e.g. composting, crop rotations etc.)	51
Awareness raising	Provides stakeholders with information on climate change, the impacts of climate change, or the environment more broadly.	38
Infrastructure	Constructs new, or refurbishes existing infrastructure (e.g. roads, canals, sea walls etc.)	38
Technology	Implements a new technology (e.g. irrigation, communications, drought resistant seeds etc.)	35
Targeting marginalised groups	Specifically targets vulnerable or marginalised groups within activities	33
Planning and policy	Creates a new policy or planning scheme, or integrates project outcomes into an existing policy or plan	28
Establishing management groups	Establishes community groups to oversee and manage project interventions	28
Livelihood diversification	Promotes and assists in establishing alternative livelihood strategies for communities	19
Early warning systems	Implements early warning systems	13
Financial schemes	Provides financial assistance schemes (e.g. loans, insurance etc.)	6

A review by McGray, Hammill, and Bradley (2007) of 135 climate change adaptation projects, implemented at all levels from community to multi-national, identified the altering of natural resource management practices was the most common activity, followed by building institutions, in which training and capacity building mechanisms are imbedded. This finding is mirrored here, with capacity building and natural resource management practices equally the most commonly used activity (both 67%). Both studies identified financial mechanisms as the least commonly used activity.

Across implementing partners, NGOs implemented projects focused on targeting vulnerable people more than other implementing partners, with 55.6% of NGOs incorporating this in the project compared to 23.5% of multilateral agencies and 29.4% of research institutes and government agencies. NGOs also reported the implementation of more activities within projects with 5.6 activities per project as opposed to 3.8 from multilateral agencies and 3.5 from research institutes and government agencies. Additionally, NGOs implemented substantially more "soft" adaptation measures, such as a raising awareness (61.1%) and capacity building and training (94.4%) than multilateral agencies (35.3% and 52.9% respectively), and research institutes and government agencies (17.6% and 64.7% respectively).

2.4 Barriers identified in the grey literature

The following section provides and discusses the barriers identified in the 25 documents. Three overarching groups of barriers were identified: socio-political, resource, and physical systems and processes. These are essentially the same barrier themes identified in a review of the academic literature review (social, resource and physical) (Spires, Shackleton and Cundill 2014). Table 5 presents these barriers with examples of each, along with the percentage of documents that described them.

Table 5: Barriers to effective CBA identified within 25 documents.

Barriers	Examples	Percent
Socio-political: the barriers resulting from the social, cultural and political context and environment in which projects are implemented		**92**
Cognitive and behavioural	• reluctance to implement new unknown technology by community members • lack of interest and commitment in supporting initiatives by project staff • internal community conflict • community cultural and religious values not in line with project objectives	76
Government structures and governance	• difficulty aligning government support with projects objectives • absence of relevant government departments at multiple levels • challenges adopting national policy on a relevant local scale • poor links within government impacting the flow of resources, specifically funding	48
Communication and language	• not presenting information and consulting with communities in a language and style that is appropriate and understandable • difficulty incorporating and linking traditional and scientific knowledge systems • poor communication surrounding project initiatives within the community • lack of clearly defined roles and responsibilities amongst implementing partners	40
Inequity, power and marginalisation	• a few elite, or powerful, members of the community having decision making power • women not being able to access information and decision making due to traditional gender roles • limited number of people involved in and benefiting from projects	32
Resource: a lack of or limited availability to the stock of assets that can be drawn on for a project to function effectively		**84**
Financial	• slow release of project funds causing project delays • Insufficient project budgets limiting the range and type of initiatives that can be implemented • high travel costs limiting the capacity of project staff to access and implement project components, particularly in remote communities	56
Human resources	• the inability of associated staff to undertake project tasks independently without oversight • staff unable to work with and support community members in building the capacity and skill sets required to perform project tasks • high staff turnover	52
Time	• difficulty establishing and building relationships amongst stakeholders • limited time for community management committees to build the skill sets and capacities needed to perform their roles independently • Longer-term project initiatives unable to be assessed properly and their benefits remained unknown	40
Access to information and technology	• limited access to relevant climate information impacting adaptation planning • access to drought-resistant seed varieties trialled in initial stages of the project was not possible without the assistance of project partners and, as such, could not be sustained • **lack of access to** radio and mobile phones by community members meant they could not access up-to-date climate information	32
Infrastructural	• poor design of an irrigation system limiting the reach of project benefits • agricultural expansion impacting downstream water quality • construction of a rock wall impacting natural wetlands	32
Physical Systems and Processes: impacts from climate change and natural hazards on project components		**24**

Socio-political barriers were most prevalent (92%) followed by resource barriers (84%), and physical systems and processes (24%). Socio-political barriers are defined here as the barriers resulting from the social, cultural and political context and environment in which projects are implemented. They include the interactions between and within stakeholder groups. These are readily divisible through thematic analysis into four categories: cognitive and behavioural; government structures and governance; communication and language; and inequity, power and marginalisation. Cognitive and behavioural barriers represent the attitudes, perceptions, beliefs, values, and behaviours of community members and associated stakeholders. These were deciphered from documents where noted, yet as they represent perceptions, values, and beliefs it is posited that the extent of them may not be fully realised through such an analysis of documentation. Government structures and governance barriers relate to the insufficient and ineffective links between different government departments, which impact access to and flow of resources, specifically funding. Communication and language barriers include difficulties associated with communicating and transferring knowledge amongst stakeholder groups. This includes between implementing agencies, government departments, and communities as well as internally within these groups. The last socio-political grouping, inequity, power and marginalisation, demonstrates that underlying power imbalances and socio-economic inequities and vulnerabilities exist in communities. Projects experiencing these issues led to difficulties achieving equal benefit sharing of project results, as well as disruptions or failures to meet project components aimed at targeting these underlying vulnerabilities.

Resource barriers are defined in this research as a stock of assets that can be drawn on for a project to function effectively. These barriers are thus categorised as a lack or limited availability of these assets. Resource barriers were noted in 21 out of the 25 documents (84%). They have been divided into five categories: financial; access to information and technology; human resources; time; and infrastructure. Financial barriers refer to the nature of project budgets in that they are limited relative to project needs, and can be slow to materialise. Access to information and technology barriers refer primarily to the inadequacy of access to information, technology, and equipment by communities. This further extends to other stakeholder groups involved in the adaptation process, including implementing bodies and government staff. Human resources relate to both the skills and capacity, and the availability of professional staff affiliated with projects. This includes both the ability of associated staff to

undertake project tasks independently without oversight, as well as the ability to work with and support community members in building the capacity and skill sets required to perform project tasks. Time constraints arise from the comparatively-short lifecycles of projects impacting the success of a range of project components from capacity building, to implementing project successes into wider frameworks. Infrastructural barriers represent interventions, such as infrastructure and new technologies that do not include sufficient understanding of the physical environmental context. As such, infrastructural barriers may lead to deleterious impacts on the community or the natural environment, or just be ineffective.

Physical systems and processes barriers refer to the direct impacts from climate change and natural hazards on project components and were discussed in six of the 25 documents (24%). These barriers relate to project components not being able to cope with the impacts of climate change.

The following section will provide a discussion surrounding the three most commonly identified barriers in this study, all being noted in over half of project documentation. These are cognitive and behavioural, financial, and human resource barriers.

2.4.1 Cognitive and behavioural barriers

Cognitive and behavioural barriers were the most common in this study, with 76% of documents noting them. The academic literature review described the existence of cognitive and normative barriers in 37% of papers (Spires, Shackleton and Cundill 2014). “Normative barriers related to how cultural/traditional norms hinder CBA action and cognitive barriers related to community perceptions and attitudes that do not align well with CBA interventions” (Spires, Shackleton and Cundill 2014: 280), differing slightly from the definition in this research. Commonly mentioned in this study was that, owing to community or individual attitudes, community members felt unable to implement projects initiatives adequately, especially when these involved new techniques or technologies. One such example from Kazakhstan stated that farmers were hesitant to introduce new irrigation technologies because of the uncertain outcomes of this unknown technology (Nyandiga and Tessa 2012). To overcome this, seeing a project element being successful (in this case the benefit of the irrigation technology) was sufficient to mobilise behaviour change among community members. This was similarly

identified in the academic review with scepticism and risk toward new agricultural technologies identified as a barrier, as communities prefer to implement activities that they are familiar with Spires, Shackleton and Cundill (2014).

A lack of interest and commitment by project staff, commonly government staff, was also mentioned in numerous documents. This extends beyond the availability and capability of staff (as described in human resource barriers below) to the attitudes of staff, their levels of interest, motivation, or commitment. A project in Peru identified internal community conflict as an issue, with the theft of irrigation equipment and destruction of Tara plants by some community members creating project setbacks (UNDP 2012). Similarly, within a Pacific Island context, Buggy and McNamara (2016) identified disputes, disagreements and jealousy within communities as contributing factors to community-based projects breaking down. Subsequently, it is important that communities not be seen as a panacea for the implementation of adaptation initiatives without understanding the local socio-political context.

Religious and cultural values of communities were discussed in many projects, especially how these inhibited the success of certain project components. In Papua New Guinea (PNG), controlling the pig population was seen as an important component of the wider adaptation approach due to their impact on the local environment. This however was unable to be adequately achieved, citing that locals have refrained from increasing consumption or other control measures due to the important traditional role pigs have in ceremonies (CARE 2015b). Religious and spiritual influences on project outcomes, in particular the impact of religious beliefs and its association on communities' willingness to tackle climate change has been widely documented (Janif et al 2016; Nunn 2009; Nunn et al 2014; Weir, Dovey and Orcherton 2016; Yoseph-Paulus and Hindmarsh 2018). This brings up an important point about who is defining barriers to adaptation in such instances when referring to culture and religion, as barriers can be defined differently by different actors (Klaus et al 2014). It seems unlikely that communities themselves see their religious views and cultural practices as barriers to adaptation activities. Further, it has been identified that many interventions do not acknowledge and account for spirituality and religious views held by communities when

planning activities despite these being important in local decision-making processes pertaining to the environment (Nunn et al 2016a).

2.4.2 Financial

Financial barriers were discussed in 56% of documents. These relate to the nature of project budgets in that they are limited relative to project needs, and can be slow to materialise. Financial barriers were found to impact projects in a range of ways including limiting the interest from governments in developing activities due to limited availability of resources. One example from a project implemented in Cambodia set out to upgrade an existing dugout canal to a cement canal, identified as essential for farming communities to ensure greater security and access to water year round in the face of increasing periods of drought and unpredictable rainfall (UNDP 2013). Owing to high construction costs, the existing dugout canal was instead rehabilitated without cement resulting in a large cohort of farmers remaining without access to water and the knowledge that the canal's lifecycle is limited. Further financial barriers were due to the slow rate of release of funds. A project from Malawi stated that the slow release of project funds delayed the activities such that they were not completed in a timely manner (UNITAR 2009). Issues of high material costs, fluctuation of exchange rates and inflation were further included in this category. Financial barriers were described further, with high travel costs limiting the capacity of project staff to access and implement project components in remote communities. The academic literature identified financial barriers in 42.1% of projects (Spires, Shackleton and Cundill 2014), as opposed to 56% in this study.

Imbedded in climate adaptation funding is a professed obligation that countries in the Global North provide support to those in the Global South (Ayers and Forsyth 2009). This is indisputably morally justified, as the impacts of climate change are disproportionately caused by those in the Global North and disproportionally impact the Global South (Althor, Watson and Fuller 2016). Though, the reality and practicality of external funding in its current form leads to a range of concerns that can limit its effectiveness and efficiency. Funding available for adaptation is limited and inadequate to meet the increasingly growing need by countries in the Global South to assist in adapting to climate change (Chong 2014; Robinson and Dornan 2016). Of the funding that does exist there can often be discrepancies between the priorities of funding bodies and local needs and priorities (Barnett and Campbell 2010; Betzold 2015;

Dean, Green and Nunn 2016). This can lead to projects proposed that will be funded rather than those considered important (Barnett 2008). In addition, the complicated application process, restricted eligibility criteria, and high volumes of paperwork make accessing funding ever the more difficult for recipient countries (Crick, Wandel, Maclellan and Vincent 2013; Dean, Green and Nunn 2016; Robinson and Dornan 2016; Weir, Dovey and Orcherton 2016). These broader-scale funding issues can be seen to trickle down to the financial barriers identified in these documents, especially in relation to accessing funding in a timely manner and the general comment that adaptation finance is limited.

2.4.3 Human Resources

Human resource barriers were discussed in 52% of documents and relate to both the skills and capacity, and the availability of professional staff affiliated with projects. This includes both the ability of associated staff to undertake project tasks themselves, as well as the ability to work with and support community members in building the capacity and skill sets required to undertake project tasks. An example from Cambodia described the difficulty in building skills and capacity of a local water management committee to develop and work independently (UNDP 2013). A project from Vanuatu stated the major challenge is mobilising existing capacity rather than assuming capacity deficits within the community. In Timor-Leste the support of government extension workers was deemed essential by all involved in the project yet the limited number of available staff meant that this continued support would not occur post the project lifecycle (CARE 2015a). Projects were impeded by human resource barriers in a range of ways, of note the collection of data and subsequent monitoring and evaluation of projects. Owing to limited capacities of staff, project outcomes were not being sufficiently recorded and consequently limited the effective evaluation of projects in identifying lessons learnt. The high turnover or absence of staff was also identified within projects.

The issue of not having adequate staff (Kirkby, Williams and Huq 2015), and the benefits of having competent trusted staff involved in CBA projects (Dumaru 2010) has been defined within the broader literature as an important component to reach positive outcomes for stakeholders involved. A study from Vanuatu in 2013 that explored CBA project implementation on Pele Island exemplifies the importance of appropriate training from implementing partners, with one comment from a recipient project community member

stating “whoever donates the project must provide training to community because they don’t have good understanding to run the project” (Buggy and McNamara 2016: 9). In addition to just providing training, it is essential that this be relevant to the culture and society in which a project is implemented, and build off the capacities that already exist both within communities and local governments (Dean, Green and Nunn 2016).

2.4.4 Barriers across implementing agencies

The level at which barriers were discussed across the different implementing structures (multilateral agencies, NGOs, research institutes and government agencies) was explored. NGOs reported on average a higher number of different barriers, with six per document, as opposed to multilateral agencies (3.8 per document), and research institutes and governments (3.25 per document). This difference was most dominant within socio-political barriers where NGOs reported three different social barriers per document compared to 1.5 in projects implemented by multilateral agencies and 1.75 by research institutes and government agencies. Looking specifically at barrier categories, the largest discrepancy was found in the reporting on inequity, power and marginalisation. These were identified in 86% of NGO documents, while in just 14% from multilateral agencies, and none from research institutes and government agencies. This could be due to the increased emphasis placed on gender and youth inclusion within many of the NGOs assessed in these documents (as discussed in section 3.1), thus making them more aware and inclined to report on such barriers. Cognitive and behavioural barriers are the most consistently reported across all organisational groups (at least 70% within each). While these results provide a valuable and interesting insight into the reporting of different barriers between organisational structures, this should not be seen as conclusive due to the small sample size.

2.5 Discussion

First, it is important to acknowledge the difficulty faced in finding projects online that had sufficiently evaluated, reported and shared the outcomes of CBA projects. Sharing experiences is an important process for stakeholders to learn and to ensure that adaptation solutions are effective and can be sustained (Nunn 2009). The need for more comprehensive documentation, reporting the efficiency and effectiveness of projects has been called for in the literature (McNamara and Buggy 2016; Reid 2016; Wright et al 2014), along with the

recognition that the sharing and publication of such information is sometimes lacking or not in an effective format (Betzold 2015; Conway and Mustelin 2014; Spires, Shackleton and Cundill 2014). Experiences from this study exemplify these issues by the high rate of project descriptions found on websites with no supporting documentation attached, no project reports that indicated what was implemented, and no comprehensive evaluations or lessons learnt provided. While undertaking thorough project evaluations costs money, time and human resources for institutions and governments implementing projects on-the-ground, it must be prioritised if practitioners, policy-makers and donors are to achieve greater, more successful outcomes; otherwise there is a risk of replicating expansive errors or even causing maladaptation. A move towards greater access and sharing of documentation is evident with the newly established Pacific Climate Change Portal, a repository for projects and resources within the Pacific region. Such developments will help improve the effectiveness and sustainability of interventions, by having access to and learning from these shared resources, as well as improve donor value for money.

The results from this research show that barriers, as identified from the grey literature, can be distinguished into three categories: socio-political, resource, and physical systems and processes. This categorisation mirrors that identified within the academic literature (Spires, Shackleton and Cundill 2014) as well as barriers found in other climate change adaptation research (Dumaru 2010; Remling and Veitayaki 2016). While it is helpful to understand what can impede successful planned CBA through such an analysis, it is important to recognise it does so from the perspective of implementing organisations; just one perspective of the process of CBA. As barriers themselves are representative of different values and perspectives (Klaus et al 2014), a more holistic understanding of barriers at different levels remains a priority. Questions such as, “what do communities themselves experience as barriers once a project has been implemented on-the-ground?” remain essential and key as they are important to understanding the longer-term success of CBA.

So, what can these barriers tell us about CBA going forward? The prevalence of cognitive and behavioural barriers identified in this study can shed light on some wider considerations of CBA and its current practice. For example, those barriers pertaining to lack of interest of the community, as well as the projects not being aligned with community, cultural or social needs

are of particular interest. This is because at the core of CBA principles is that the process must start with communities defined needs and perceptions (Berger and Ensor 2014), and is a key distinguishing factor that defines CBA from other types of adaptation interventions. Noted within the academic literature is the concern that planned CBA projects are not in line with the critical and innovative nature of CBA (Dodman and Mitlin 2013; Wright et al 2014). Of particular note here is the concern that top down approaches continue to be used in CBA projects under the guise of being "community- based" (Reid and Schipper 2014). The barriers identified in this research, as described above, gives further rise to these questions surrounding the critical and innovative edge of CBA as explored in the academic literature and whether this is being lost in the practice of actually "doing" adaptation on-the-ground.

2.6 Conclusion and future directions

This study has explored the grey literature, consisting of evaluation reports of projects undertaken in the last ten years (2006–2016), to provide an overview of the current state of play of CBA within the grey literature and identify barriers faced in achieving successful CBA. An overview of 69 projects was provided in which a majority of projects were implemented by multilateral agencies, and focused heavily in Asia. Projects mainly concentrated on addressing food security issues and/or agriculture and aimed at helping communities adapt to changes in rainfall patterns. Barriers encountered during the CBA process were explored through a thematic analysis with three barrier themes identified: socio-political, resource, and physical systems and processes. These were similar to that of an academic literature review with a similar focus. It was also identified that, cognitive and behavioural barriers were most prevalent, noted in 76% of reports. Human resource barriers and financial barriers were also reported on regularly, in over 50% of reports.

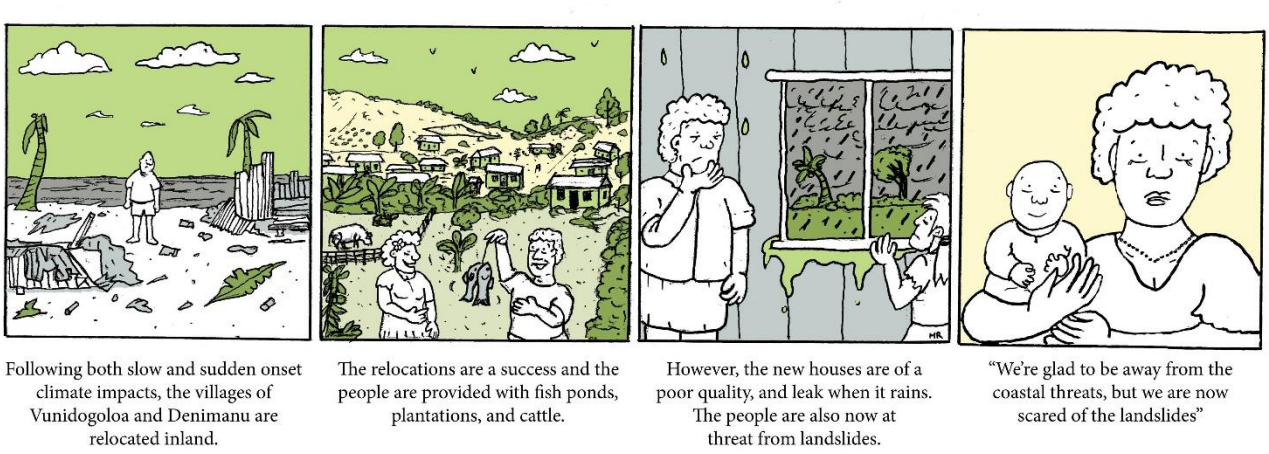
These findings represent a need for greater sharing and open access to project documentation, justified through the difficulty in finding project documentation such as evaluation reports for this study, as well as the often-limited information presented in them. Further, questions about the critical edge established within the academic literature of CBA and whether this is being applied on-the ground have been raised. To improve understanding of CBA barriers, future research into the barriers faced from the perspective of recipient communities would be beneficial. Doing so would allow for a more holistic and deeper understanding of how CBA

barriers can be addressed according to communities themselves so that CBA initiatives can provide better outcomes for people at the frontline of climate change.

3.0 Retreat: Exploring livelihood outcomes of planned relocation on Vanua Levu Island, Fiji

"Migration is often misperceived as the failure to adapt to a changing environment. It is, however, one of the main coping and survival mechanisms that is available to those affected by environmental degradation and climate change."

Sylvia Lopez-Ekra –



Following both slow and sudden onset climate impacts, the villages of Vunidogoloa and Denimanu are relocated inland.

The relocations are a success and the people are provided with fish ponds, plantations, and cattle.

However, the new houses are of a poor quality, and leak when it rains. The people are also now at threat from landslides.

"We're glad to be away from the coastal threats, but we are now scared of the landslides"

Place of Chapter in thesis

This chapter presents the first case study of this thesis (as shown in Figure 9). This case study asses the effectiveness of the planned retreat (or relocation) of two communities on Vanua Levu Island, Fiji. This chapter contributes to research aims 2 and 3:

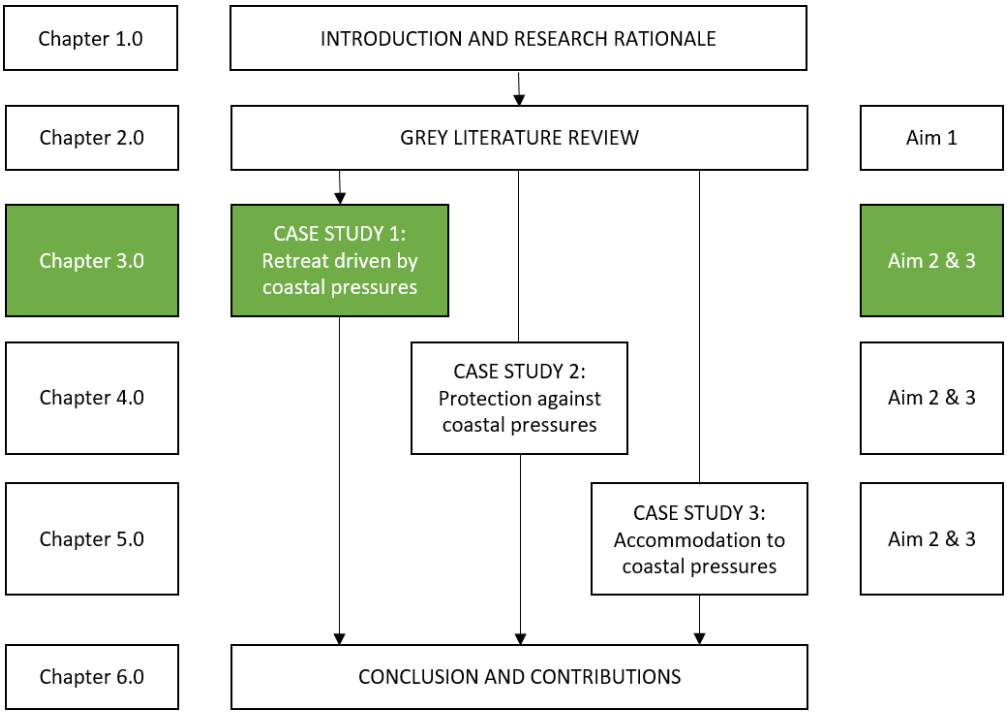


Figure 9: The place of chapter 3.0 in thesis.

Aim 2: Explore the effectiveness of climate change adaptation projects implemented in rural coastal Pacific Island communities in reducing the vulnerability of target communities, across the tripartite of responses: retreat, protect, and accommodate (linked to Chapter 3.0, 4.0, 5.0, and 6.0)

Objective 2a: Evaluate the outcomes of projects from community perspectives in terms of project appropriateness, efficacy, equity, impact, and sustainability;

Objective 2b: Identify dominant barriers to achieving successful adaptation in case study sites.

Objective 2c: Identify if projects have successfully reduced the vulnerability of target communities, and why/why not;

Aim 3: Provide recommendations and insights into both the effectiveness of climate change adaptation in reducing the vulnerability of rural coastal communities (linked to Chapter 6.0)

Objective 3a: Drawing on the case studies, elucidate what factors contributed to the success, or failure, of planned adaptation;

Objective 3b: Explore opportunities through which adaptation can be targeted to improve the outcomes for rural coastal communities in Pacific Islands

This chapter has been written as a manuscript and published in the journal *Social Sciences,* with some additions made in the version included in this thesis, as stated:

– Piggott-McKellar, A.E., McNamara, K.E., Nunn, P.D. and Sekinini, S.T. 2019. Moving people in a changing climate: Lessons from two case studies in Fiji. *Social Sciences*, 8(5), 133. DOI: 10.3390/socsci8050133

Statement of Authorship for this Chapter

The conception and design of this chapter was undertaken primarily by the candidate (80%) and in part by Karen McNamara (20%). The analysis and interpretation was undertaken primarily by the candidate (80%) with assistance from Seci Sekinini (20%) who acted as translator and research assistant during fieldwork. This chapter was written solely by the candidate (100%) with editing done by the candidate (20%), Karen E. McNamara (40%), and Patrick D. Nunn (40%).

Abstract

High levels of vulnerability to climate change impacts are rendering some places uninhabitable. In Fiji, four communities have already initiated or completed the task of moving their homes and livelihoods to less exposed locations, with numerous more communities earmarked for future relocation. This paper documents people's lived experiences in two relocated communities in Fiji—Denimanu and Vunidogoloa villages—and assesses the outcomes of the relocations on those directly affected. This study in particular seeks to identify to what extent livelihoods have been either positively or negatively affected by relocation, and whether these relocations have successfully reduced exposure to climate-related hazards. This study shows that planned climate-induced relocations have the potential to improve the livelihoods of affected communities, yet if these relocations are not managed and undertaken carefully, they can lead to unintended negative impacts, including exposure to other hazards. We find that inclusive community involvement in the planning process, regular and intentional monitoring and evaluation, and improving livelihoods through targeted livelihood planning should be accounted for in future relocations to ensure outcomes are beneficial and sustainable.

3.1 Introduction

Despite high levels of internal resilience, SIDS, as which all PICs identify (Barnett and Campbell 2010), have been labelled as some of the most vulnerable places to climate change. This is largely due to a combination of high exposure to climate change impacts as well as a range of underlying social, historical, political, and economic vulnerabilities (Huq and Reid 2007; Jackson, McNamara and Witt 2017; Kelman 2014). Climate change impacts experienced in PICs are predominantly coastal and include rising sea-levels, intensification of cyclones resulting in increased storm surge extent, coastal erosion, and changing rainfall patterns (Chand et al 2016; IPCC 2014c; Keener et al 2012). Exposure to such climate change impacts is exacerbated by the presence of people, livelihoods, services, and assets in places that can be adversely affected (IPCC 2014b). PICs have high coastline to land mass ratios and primarily coastal settlements (Barnett and Campbell 2010) leading to a significant percentage of the population at higher risk of exposure (Kumar and Taylor 2015). This is further exacerbated by a range of underlying vulnerabilities, such as exposed infrastructure, comparatively low incomes, declining traditional knowledge and practice, historical factors such as colonial legacies, and a dependence on climate-sensitive resources and industries, such as agriculture

and fishing (Barnett and Campbell 2010; Connell 2015a;2015b; Kelman 2014; Nunn 2009). For some communities, this confluence of factors has led to people being unable to sustain their everyday livelihoods in their current locations.

The vulnerability of PICs reveals the deeply inequitable nature of climate change, in that those contributing the least to climate change through their GHG emissions are also those that are currently most impacted (Althor, Watson and Fuller 2016). For example, SIDS combined contribute less than 1% of the total annual global output of carbon dioxide (Voccia 2012), with PICs contributing less than 0.3% (Weir, Dovey and Orcherton 2016). Layers of inequality also exist intra-nationally. The peripherality of a community can indicate higher exposure and vulnerability due to distance from core centers and associated resources (McNamara et al 2018b; Nunn and Kumar 2018). Further, certain groups of people within a community are more vulnerable than others (Arora-Jonsson 2011; Dodman and Mitlin 2013; Heltberg, Siegel and Jorgensen 2009). Owing to traditional gender roles in patriarchal contexts, women often have less access than men to information as well as decision making power (George 2010; 2014), as is the case in many rural Pacific Island communities. Accounting for this, all women (as well as other groups within a community) are not equal with individual vulnerability dependent on a range of intersecting factors including class, education, employment, income, and status (Arora-Jonsson 2011). If these factors are not accounted for when planning adaptation responses, they can perpetuate such inequalities (Carr 2008) and subsequently reduce the legitimacy, equity, and sustainability of adaptation.

When adapting to coastal threats such as sea-level rise and associated impacts there are three typologies of adaptation measures employed: Accommodate, protect, and retreat (Williams et al 2018). It is important to make the distinction between autonomous retreat (or relocation) of communities, as opposed to planned relocation, which usually involves the coordination and management of the process by an external entity. The causes and evolution that have led to the increase in the latter form of relocation are worth briefly exploring. First, it is important to recognise that internal migration within PICs has occurred throughout history and has been a vital aspect of island communities' livelihoods, resilience, and survival (Barnett and McMichael 2018), with people and entire communities moving in response to changing environmental conditions, as well as in search of improved resources (Campbell 2014). The change towards a

less mobile lifestyle, a consequence of colonisation and globalisation, has resulted in communities that have become increasingly permanently attached to place. As such, an inherent adaptation strategy of intentional impermanence common in oceanic island societies has been largely lost (Campbell and Bedford 2014; Gharbaoui and Blocher 2016; Janif et al 2016).

Planned relocation refers to a "process in which persons or groups of persons move away from their homes or places of temporary residence, are settled in a new location, and provided with the conditions for rebuilding their lives" (UNHCR 2015: 9). Of note, within this definition is the explicit mention that relocation should include a focus on providing conditions through which relocated persons can rebuild their livelihoods. This is especially important to consider as research into other forms of resettlement (such as DIDR) shows that frequently relocations are unsuccessful in providing successful and holistic outcomes for affected communities because they fail to address such ancillary concerns (Donner 2015b; Tadgell, Doberstein and Mortsch 2018). Rather, detrimental outcomes of unemployment, landlessness, homelessness, increased morbidity, loss of access to common property resources, marginalisation, and food insecurity have ensued (Cernea 1997; Piggott-McKellar et al 2019 – Appendix 1). From this emerges the need to ensure that forethought is built into relocation planning so that such deleterious livelihood outcomes are not replicated.

Communities are already undertaking the process of planned climate-induced relocation in PICs, including in the Solomon Islands (Albert et al 2018), Papua New Guinea (Connell 2016; Lipset 2013), and Fiji (Barnett and McMichael 2018; Charan, Kaur and Singh 2017; Martin et al 2018; McMichael, Farbotko and McNamara 2018). Climate change impacts are projected to be amplified in the future, affecting an increasing range and number of people (IPCC 2014c; Foresight 2011). As a result, it is likely that a greater proportion of people will have to relocate, with some estimates predicting millions may be affected (Ferris 2015), yet the exact numbers are extremely challenging and problematic to predict and quantify (Barnett and O'Neill 2011). The process of planned relocations from climate change has therefore emerged as a critical new field of research and policy debate. Viewing climate-induced relocation as not only an adaptation response, but a form of loss and damage has been argued (McNamara, Bronen, Fernando and Klepp 2018a) and is being considered by the United Nations Framework

Convention on Climate Change (UNFCCC) through its work program on loss and damage. An international set of guidelines pertaining to climate-induced relocation was established by the United Nations High Commissioner for Refugees (UNHCR) in conjunction with Georgetown University in 2015 (UNHCR 2015). Ferris (2015) argues the importance of further developing country-level policies and plans that can provide a framework and ensure that relocation facilitates positive outcomes. Fiji has recently released Relocation Guidelines (that were not publicly available at the time of this research) and is the first country in the world to have such a national framework (Fiji Government 2018), while Vanuatu has recent guidelines on climate change and disaster-induced displacement (IOM 2018).

As climate-induced relocations are likely to increase, the importance of understanding and appropriately managing the process is evident. Within Fiji, four iTaukei (Indigenous) communities have already initiated or completed the relocation of their communities with over 80 further communities recognised by the Fijian Government as in need of future relocation (Barnett and McMichael 2018; Republic of Fiji 2014). Key to reducing the vulnerability of communities to current and anticipated climate change impacts is: Ensuring the process of planned climate change-induced relocation is undertaken in a manner that both reduces the exposure of affected communities to climate change impacts, a key driving force of relocation (Hino, Field and Mach 2017); and guaranteeing affected communities have a chance to successfully rebuild their livelihoods in the new location (de Sherbinin et al 2011). With this context in mind, this research is driven by two key questions:

(1) To what extent have livelihoods been either positively or negatively affected by relocation?
(2) Have relocations reduced exposure to climate-related hazards?

This analysis will be undertaken through an exploration of two recently relocated communities—Vunidogoloa and Denimanu—on Vanua Levu Island, Fiji. This will then provide the context through which to generate insights and lessons that can be applied to future relocation initiatives going forward.

3.2 Study Sites

Two case study sites are considered in this research, both of which are located on Vanua Levu Island in Fiji. There are 330 islands in Fiji, of which just over 100 are permanently inhabited. The two largest islands, Viti Levu and Vanua Levu, are home to a significant percent of the total population of just over 900,000. Vanua Levu, the second largest island, is where both case study sites in this research are located, although Denimanu is technically offshore. Across Fiji many people live in rural coastal areas, relying on a subsistence lifestyle involving both terrestrial and marine resources. Land in Fiji is an important part of the culture in terms of identity, spirituality, and subsistence (Campbell 2010). Among iTaukei (Indigenous) Fijians, land is codified as mataqali (family land ownership). Almost 90% of land in Fiji is customarily owned (Campbell 2010). For this reason, this also makes relocation a practical issue raising broader questions of land insecurity. Yet, in both case studies for this research, communities were able to move within or across closely-related mataqali lands. Figure 10 shows the location of Fiji in the Pacific Islands region, Vanua Levu island, and the two case study sites.

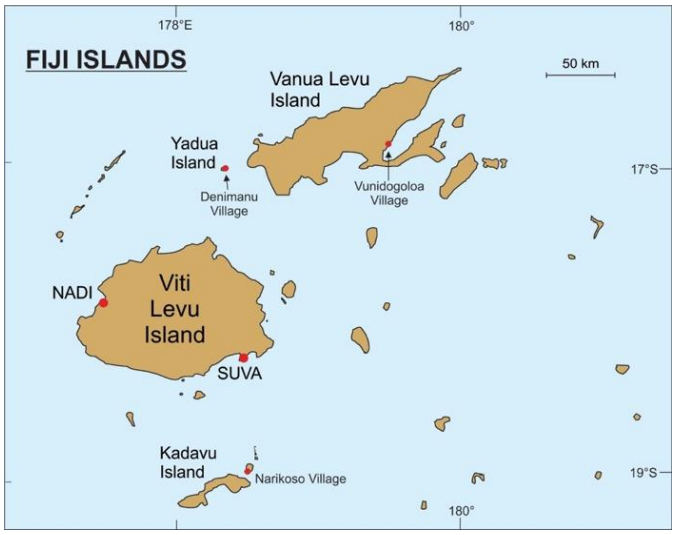


Figure 10: Map of Fiji showing the two case study sites (Vunidogoloa and Denimanu villages).

It is noteworthy that these two case studies exhibit the common contrasts within the range of such relocations. First is the portion of the village relocated, with one case study having a complete village relocation and the other a partial village relocation. Second is the impacts that drove the relocation. The first case study describes how relocation was driven by slow-onset climate change impacts while the other study site is an example of sudden-onset impacts, in

this case driven by cyclonic storm surge activity. While not uncritically attributable to anthropogenic climate change, the increased strength of cyclonic and storm activity has a level of climate change attribution (Walsh et al 2016). Both of these planned relocations were supported by the Fiji Government through both its Ministry of Rural and Maritime Development and its National Disaster Management Office.

3.2.1 Vunidogoloa

Vunidogoloa is located approximately a two-hour bus ride from the nearest town of Savusavu on Vanua Levu Island. It has a population of 153. The people rely heavily on fishing and subsistence agriculture for their livelihoods, as well as cash from market sales of fish and crop surpluses and locally-made crafts. Vunidogoloa has been labeled as the first climate-induced relocation undertaken by the Fiji Government (Charan, Kaur and Singh 2017; Witschge 2018).

Vunidogoloa presents a case of an entire village relocation. The old village was originally situated on the coast. It is important to note that the village had only been in this coastal location for approximately 100 years. Prior to this, they were part of a larger inland village and had relocated to the coast autonomously to be closer to the sea and access its resources (pers. comm. Village Headman 2017). In its former location, the village was increasingly experiencing slow-onset climate impacts including tidal inundation, coastal erosion and saltwater intrusion. This impacted on infrastructure and made growing food crops increasingly difficult. In response, the village was relocated roughly 2 km inland, adjoining the main road (Plate 2). This relocation occurred on land belonging to the same mataqali. The relocation included with it housing, as well as livelihood provisions including fish ponds, pineapple plantations, and cattle.

Plate 2: The new village relocation site of Vunidogoloa.

An in-depth recent review of the Vunidogoloa relocation is provided by Charan, Kaur and Singh (2017).

3.2.2 Denimanu

Denimanu village is on Yadua Island, situated off the western extremity of Vanua Levu Island. The village is accessible only by boat. Denimanu is the only village today on Yadua Island with a total population of approximately 170 people. It is also worth noting that Denimanu village has previously independently relocated, prior to this planned relocation. The village has moved (at least) twice in search of better food and living conditions. They have been living in their current location for at least 100 years (pers. comm. Village Headman 2017). The village also relies heavily on subsistence fishing and crop agriculture with surplus sold for income.

The planned relocation that took place in Denimanu was a partial relocation, with approximately half (19 households) of the village relocated. The houses of the affected people were destroyed by impacts from Cyclone Evan in December 2012. The 19 affected dwellings were located at the front of the village, closest to the coastline. New houses were built approximately 500 m away on a slope of the hill in rows (see Plate 3). The new houses were completed in mid–late 2013. This new location was chosen because the boundaries of the village and the encroaching shoreline made it impossible to rebuild the houses in the location they were previously as the land had been lost. There are two *mataqali* in Denimanu. A consultation was undertaken between the government and these *mataqali* to agree on the new location. A more detailed recent review of this relocation is provided by Martin et al (2018).

Plate 3: The new village relocation site of Denimanu.

3.3 Methods

This section will describe the methods undertaken during this field study. This has been broken into sections: Data collection and analysis, ethical procedures, and limitations.

3.3.1. Data Collection and Analysis

Fieldwork was undertaken in both villages in November and December 2017. A local government official acted as a protocol officer and was present throughout the duration of these visits to act as a liaison and entry point to the communities. Both the protocol officer and one of the researchers/authors (a Fijian national) were translators throughout the research.

The method of data collection included FGs, interviews and participant observation. Initially two FGs were undertaken in Vunidogoloa (one men's and one women's), and three in Denimanu (two women's groups and one men's group). As Denimanu was a partial relocation, both groups (those that relocated and those that remain in the original village) were engaged in the research. A second visit to Vunidogoloa was undertaken three weeks after the initial fieldwork where a further two FG discussions were undertaken (one women's and one men's). This was done to both gather additional information and clarify findings to date. This resulted in a total of seven FGs involving 54 participants across both sites. The division of FGs by gender allowed both genders to talk freely, an integral aspect of this research. This is especially important in Fiji as women are often excluded from decision-making processes and do not always have opportunities to speak up in group settings (Singh-Peterson and Iranacolaivalu 2018). The FGs involved discussion about the relocation including participants' experiences and involvement in the process of relocation, and the outcomes since it occurred. Group activities were undertaken that involved participants ranking their perspectives of life before and after relocation across a range of variables. These FGs were recorded, and later transcribed, with detailed notes taken.

Interviews were also undertaken with key members of the community, including leaders, church representatives, and teachers. Interview participants were identified largely from the FGs. From this, the snowball method was used to identify other participants. In this way, discussions with 15 people were undertaken across both sites. Notes were taken during these discussions. Participant observation was an added aspect of the research that gave context to

discussions and deepened the research team's understanding of everyday life in these communities.

The data were analysed through a livelihoods framing, owing to the often-detrimental impact relocating communities can have on the livelihoods of those affected. Livelihoods are understood as the resources through which people have access to live a sustainable and fulfilling life and can be measured through numerous avenues and framings (Mallick and Sultana 2017). The Sustainable Livelihood Approach (SLA) is one common lens to understand how people generate a livelihood and how interventions can be designed effectively and appropriately in light of these (Scoones 1998). The SLA considers assets across five capitals (natural, social, financial, human, physical) to be essential to how people can build a livelihood (Bebbington 1999; Morse and McNamara 2013). Owing to the impact of relocation on culture, as well as this being an often-understudied aspect of livelihoods, including the invisible assets of spirituality, connection to place, and ritual (Kingston and Marino 2010), the addition of cultural capital is included here. Assessing the outcomes of relocation using the livelihood assets from the SLA framework has similarly been employed by previous researchers (Mallick and Sultana 2017).

The data gathered from the seven FGs and 15 interviews were compiled. This data were disaggregated according to the six livelihood asset groups employed in this research: Natural, social, financial, human, physical, and cultural capital. The livelihood analysis focused on changes in livelihoods as experienced by community members since the relocation. Changes that were commonly identified within the data were coded as a positive, negative or no change. This allowed understanding and exploration of the impact from relocation across each asset group and formed the basis for the results.

3.3.2. Ethical Procedures

Ethical procedures under the guidelines of the University of Queensland were followed. This included gaining informed consent from participants to participate in this study, and undertake and record FGs and interviews. It is important to acknowledge that Vunidogoloa, known widely as the first climate change relocation site, has had many visitors. This was especially prominent as the research team visited while the recent Conference of the Parties (COP) to the UNFCCC

was occurring. As Fiji was hosting this event (externally in Germany), there was high exposure of this site and numerous journalists had recently visited Vunidogoloa. As such, undertaking appropriate ethical procedures such as discussing the research, including aims, data collection, storage and analysis, expectations, confidentiality, outputs, and opportunities for feedback, prior to seeking participants' informed consent was essential.

3.3.3. Study Limitations

There were a number of limitations experienced in this research. First, as the research used primarily qualitative methods, there is the assumption that the information provided by participants was true and honest as to their own experiences. Alternatively, there might have been a high level of positive response bias during FGs and interviews. This is especially relevant when considering how the large number of visitors in Vunidogoloa might influence participants' responses. Second, the use of translators can cause issue with difficulty translating some words (Rudiak-Gould 2012). Third, not revisiting Denimanu for a follow-up visit to allow clarification is seen as another limitation. Finally, many questions involved asking the participants to retrospectively provide information on life prior to relocation for which there could be some issues related to memory.

3.4 Socio-Political Context of Relocations

The socio-political context in which these two relations sit varies significantly. In Vunidogoloa, it was the village headman who approached the government asking to be relocated (Charan, Kaur and Singh 2017). After initial discussions, the village was planned to be relocated in 2012, although this was eventually delayed until January/February 2014. The delays stemmed from a range of factors including concerns that the chosen site was not stable and unduly exposed to erosion, as well as delays in building the new houses (Tronquet 2015). Vunidogoloa is seen as the 'poster child' for climate change relocations, exemplified by the numerous publications and news articles about the relocation (Brill 2017; Charan, Kaur and Singh 2017; Meakins 2017; Rubeli 2015; Tronquet 2015; Witschge 2018). Since the most recent election (November 2018), Fijian Prime Minister Bainimarama has publicly referred to the people of Vunidogoloa as *liumuri* (backstabbers) as they stated they did not vote for him despite his government relocating the village (Rawalai 2018), possibly exemplifying a level of political expectation resulting from the relocation. On the contrary, the relocation in Denimanu sits within a

different context, garnering little public and media attention with few articles that discuss it in detail (exceptions include Bukalidi 2013; Martin et al 2018).

Within both villages, there was an expressed lack of involvement in decision-making processes by the village members themselves. Within Vunidogoloa while it has been posited that the process was based on "a consensual and participative decision-making process" (Tronquet 2015: 29) local residents stated that a lot of what was discussed did not come to fruition: "*All the government agencies came in to the new site so we think that everything will be done . . . once it is about to finish and we find out that some things were wrong because we were never informed, we were just told. We believe [decisions] were just between the contractors and the government*" (Vunidogoloa FG, Men). In Denimanu, village members stated that there was no real consultation with the community at all pertaining to what would be included in the relocation, but rather it was informed by the government that a relocation would happen: "*They came to the village and notified us of the relocation in an information session and they gave us the reason why we have to relocate*" (Denimanu FG, Men).

While there were concerns expressed about a lack of participatory consultation with the entire community, women felt that due to societal and cultural norms they were specifically unable to voice their opinions about the relocation. This sentiment is expressly voiced through the following comments by both villages: "*The men agreed to relocate . . . we would like to say that the men don't consult us. Only the men, the village headman, and the chief, they discuss . . . We are just told to listen. When the men say we have to go, we have to go. If they say we have to relocate, we relocate.*" (Denimanu FG, Women); and "*For us, the women, we just listen to whatever the men say and we just agree. They never consult us. The voice of the men is the only voice that is heard, so we just listen to that voice. So whatever the men has agreed we just consent to it*" (Vunidogoloa FG, Women). These comments confirm that the gendered cultural and societal norms, which often exclude women from decision-making processes, were not adequately addressed through the process of these relocations, serving to perpetuate rather than alleviate such inequalities.

3.5 To What Extent Have Livelihoods Been Either Positively or Negatively Affected by Relocation?

The UNHCR climate change relocation guidelines state Relocated Persons should be supported to maintain their traditional or previous livelihoods, and, if not able to be done, the provision of new opportunities for livelihoods suitable to the resettlement site should be afforded. Owing to the importance of accounting for livelihoods both through a long history of deleterious outcomes arising from resettlements, as well as being an important aspect of vulnerability reduction, here a livelihood perspective is taken to understand the impacts on affected people from the relocation process. The outcomes of relocation as expressed by community members are shown in Table 6 across natural, social, financial, human, physical and cultural capital. Four sub-sections will be discussed below as they offer insights and contrasts between the two relocated communities: Housing and community infrastructure, social cohesion and cultural assets, health and education, and access to common property resources and food security.

3.5.1. Housing and Community Infrastructure

In both villages, following relocation, there were improvements in housing and community infrastructure. Of note is the provision of facilities in the new village compared to the old village. Solar power was made available for all new households in both villages, and water tanks were provided in Denimanu. In the previous locations only a limited number of people had access to electricity. Further, flush toilets and showers were also installed in both new villages. While the relocation did provide numerous benefits to the villages as documented above, concerns surrounding appropriateness and sustainability of such were raised. In Vunidogoloa, the houses did not include a kitchen as promised, a potential outcome of the rush to finalise the relocation. This meant that villagers had to build kitchens themselves. In Denimanu, when the rain is strong the water leaks into the houses in the new village: "*So when it rains heavily the whole house is wet . . . overall it is just poor because we have water seep through the door frames and go inside so it rusts and then you can't open the door*" (Denimanu FG, Women). This is a key concern considering Fiji is located in the tropics with heavy rainfall throughout much of the year. It was further explained that the showers and toilets blocked regularly. Further, drainage systems were not sufficiently implemented in either village, causing major erosion concerns. In Vunidogoloa, the government came back to address this aspect of the

relocation, but it has still not been completed at the time of research with unused drain pipes scattered around the village.

Table 6: Outcomes on community livelihoods from the village relocations in two communities, denoted as: Positive change (+), no change (0), negative change (-)

	Outcomes from Village Relocation	
Livelihood	**Change**	**Description**
Natural		
Water security	+	Improved water security through provision of water tanks in Denimanu
Food security	+	Improved food growing potential due to improved land quality in Vunidogoloa
	+	Provision of pineapple crops, fish ponds, and cattle in Vunidogoloa
Common property resources	0	Maintained access to common property resources such as wild food crops and ocean resources
	-	Reduced access to ocean for fishing in Vunidogoloa
Social		
Feelings of safety	+	Improved feelings of safety from climate change hazards in Vunidogoloa
	+	Improved feelings of safety from coastal hazards in Denimanu
	-	Heightened feelings of fear associated with mass sediment movements in Denimanu
Community cohesion	+	Strengthened sense of community in Vunidogoloa
	+	Strengthened sense of cohesion amongst women in Denimanu
	-	Some division across relocated and non-relocated villages in Denimanu experienced by men
Financial		
Financial Security	+	Improved financial security due to improved access to markets in Vunidogoloa
Access to markets	+	Improved access to markets through better access to the main road in Vunidogoloa
Livestock	+	Provision of cattle in Vunidogoloa
Human		
Heath	+	Increased access to town services, including medical facilities in Vunidogoloa
	-	Detrimental impacts on women health from cleaning septic tanks in Denimanu
	-	Reduced distance to health center for the relocated village in Denimanu
Education	+	Improved access to school in Vunidogoloa
Physical		
Housing	+	All affected residents received new houses
	+	High satisfaction with the layout of housing
	-	Water leaks through walls during periods of heavy rain
Access to services	+	Solar power provided to all new houses
Facilities	+	Showers and flush toilets provided to new houses
	+	Water tanks provided for households in Denimanu
	-	Kitchens not built in Vunidogoloa
Communal infrastructure	-	Drainage systems were not built
	-	Limited septic tanks in Denimanu
Cultural		
Land	-	Reduced access to the ocean which is important spiritually in Vunidogoloa
	0	Both villages remained on village owned land
Religious practices	+	Strengthened level of faith through the relocation process

** Note: comments apply to both villages unless a village name is explicitly used*

3.5.2. Social Cohesion and Cultural Assets

Vunidogoloa residents were emphatic that they felt the sense of community had strengthened during and since the relocation. This was expressed because participants felt that the community had come together and made the decision to move themselves, representative of the fact that it was the village headman who approached the government to relocate. People also stated that they found strength in their Christian faith through coming together as a community and overcoming the struggle of moving: "*A lot of our faith in relocating was placed in our belief. We did a lot of prayer sessions*" (Vunidogoloa Interview). In Denimanu, while on average there was an overall improvement in social cohesion, when disaggregating this across men and women, women noted improvements while men experienced negative outcomes. The women's group noted that the relocation has strengthened a sense of community because the process forced them to work together. The men discussed some challenges with working together on village projects. These findings pertaining to social cohesion can be largely explained by two factors: the size of the village and the type of relocation. Vunidogoloa being a small village and relocated as an entire unit meant that they were able to stay together and united throughout the process. Denimanu on the other hand is a larger village and was only partially relocated therefore disrupted aspects of daily life and activities for some residents. In terms of the cultural impact of the relocation on communities, the impacts were reduced due to both villages relocating within closely-related *mataqali* lands. Yet, the move away from the ocean in Vunidogoloa has impacted spiritual ties as the ocean is an important part of village culture.

3.5.3. Health and Education

Mixed outcomes across health and education were noted across villages. In Denimanu, challenges associated with septic tanks in the relocated village were noted regularly throughout village discussions. There were only two sewage septic tanks provided for the 19 houses. As a result of this, health concerns were noted by some women, as they were responsible for regularly cleaning out the septic tanks. These issues experienced by women pertaining to cleaning the septic tank are explained through the following comment: "*We have to do it. So we put on our pants, cover our noses, cover our hair with plastic, and we wear gloves and we take turns bailing the septic tank. So all the women in the house have to help out, the men don't and say wait for the government but we know the children will get sick*" (Denimanu

FG, Women). Further, the relocated village expressed that the health center was going to be moved in between the original and relocated villages yet remains at the opposite side of the original village, thus making access more challenging for them. As the relocated village only moved roughly 500 m this is not seen as a major detriment.

In Vunidogoloa, positive outcomes occurred in terms access to services, specifically schooling for children and medical services. This is due to the relocated village being close to the main road as these services are only available using road transport: "*The relocation was good because it is [now] easy to go to school as you have been to the old village you know how hard it is to get to the main road to catch the bus to go to school*" (Vunidogoloa FG, Women).

3.5.4. Access to Common Property Resources and Food Security

Access to common property resources has been maintained in both villages due to the short distance of the relocations. In Vunidogoloa the community moved within walking distance from the old site. This makes the old site and the resources that are there still available for people to use. Examples include the ocean where people still go down to fish regularly. Yet this has resulted in fishing becoming harder because of the extended distance to access the ocean, formerly their main livelihood source. People also go down to the old site to collect coconuts and pandanus leaves for weaving. As Denimanu moved only 500m there has been no disruption to access of common property resources. While food security has been unperturbed in Denimanu, in Vunidogoloa village members noted improvements since the village is now located on the land where previous agriculture and crop production was undertaken. Closeness to agricultural fields has resulted in reduced labour inputs due to reduced walking distances. Further, within Vunidogoloa there was provision of pineapple crops, cattle, and fish ponds, all of which are utilied by the village, although the residents expressed the quantity of each provided to the village were less than promised: "*Just to give an example, the pineapple farm, the Ministry of Agriculture promised we would be given 48,000 tops but they only gave 5000. This is just an example, for the fish ponds they told us they were going to dig eight they only gave four*" (Vunidogoloa FG, Men). These outcomes have also improved the financial security of village members in Vunidogoloa due to surplus food crops to sell at markets, especially since access to markets has improved from road access.

Overall, there have been numerous positive livelihood outcomes that have arisen as a result of the relocation. Yet, notably there have been some serious implications as well. We can see that the benefits of both villages in being able to move within close mataqali is clear as it has allowed spiritual connections to be maintained as well as access to common property resources which are important components of village livelihoods. Further, the positive outcomes associated from the whole community relocating, as was the case in Vunidogoloa, has allowed the community to maintain a strong sense of social cohesion and unity.

3.6 Have Relocations Successfully Reduced Exposure to Climate-related Hazards?

Vulnerability to climate change is a product of much more than exposure to hazards. Yet when referring to climate-induced relocation, moving rural villages from areas of high exposure to those of lower exposure remains a critical process. As such, this section explores whether the planned relocations have been successful in reducing exposure to climate-related hazards for affected people in these two case studies.

Plate 4: FG exercise showcasing water surrounding a home in the old site of Vunidogoloa village.

Prior to relocation, Vunidogoloa was primarily exposed to coastal pressures including flooding, coastal erosion, and salt water intrusion. This is aptly exemplified through a FG exercise; participants were asked to draw homes in the old village, one group drew a home surrounded by water (Plate 4) describing the threat this posed to livelihoods. This exposure to coastal

pressures resulted in the village moving roughly 2 km inland, a significant distance from the ocean and the associated locational exposure. As such, people expressed a strong sense of improved feelings of safety since the relocation: "*We were so fearful because of the tides living at the old site. We were happy to move away from that fear*" (Vunidogoloa FG, Women).

In Denimanu, the village members who were relocated were originally situated at the front of the village. As such, they were exposed to erosion and tidal inundation and were most severely impacted from Cyclone Evan in 2012, prompting the relocation. The relocation saw 19 new houses built on the hill roughly 500 m from the village. While reducing exposure to coastal threats, the relocation site has presented new kinds of exposure. The location of the new settlement on a hillslope, coupled with the clearing of land to make way for the houses, has resulted in concerns about mass movements including soil erosion. This was briefly yet similarly noted in a recent analysis of an impending relocation in Narikoso, Fiji (Barnett and McMichael 2018). In Denimanu, these concerns were further exacerbated by inadequate site drainage, as described above. This threat is pertinent as a landslide had recently destroyed the primary school on the opposite side of Denimanu village (see Plate 5) and people noted a recent, smaller landslide had occurred close to their homes. This concern is illustrated through this quote from the women's FG: "*We were delighted with the move to the new houses, but we were still worried about the landslide because the houses were on the hill and we know this place. Although we were happy we were moving away from the wave surges, we were worried about this landslide. Especially when there is rain*" (Denimanu FG, Women).

People in relocated Denimanu regularly expressed that they felt they would have to move again in the future. It is important to note that erosion is not a specific climate change related hazard, yet it is one that can be exacerbated by climate change with the increasingly intensified rainfall events on a reduced number of days. This coupled with the clearing of land to build houses and environmental practices of slash and burn agriculture enhances this threat. These signify secondary climate impacts where the impact is not direct, yet exacerbated by the changing climate. It is important to note that fieldwork was undertaken during the wet season when these threats are particularly high.

Plate 5: The landslide that destroyed the primary school in Denimanu village.

Reducing exposure to climate-related hazards is one factor, albeit an important one, to consider when relocating communities. From these case studies we see that relocation has the potential to Reducing exposure to climate-related hazards is one factor, albeit an important one, to consider when relocating communities. From these case studies we see that relocation has the potential to reduce exposure to climate-related hazards of affected communities, as seen in the case of Vunidogoloa. Yet, if relocations are not planned appropriately, accounting for future climatic and environmental processes, they can instead expose communities to other kinds of hazards, as experienced in Denimanu.

3.7 Community evaluation of the adaptation project

This section (3.7) is an addition the publication and has been included in this thesis to satisfy research objective 2a. *evaluate the outcomes of projects from community perspectives in terms of project appropriateness, efficacy, equity, impact, and sustainability.* As such the following section evaluates the projects across these criteria.

3.7.1 High levels of Appropriateness

Appropriateness is referred to as 'the overall relevance of the project and associated suitability of the intervention in terms of community priorities and their cultural and social ethos'. The appropriateness of the relocations in Vunidogoloa and Denimanu presented in this case study were notable as both villages had been significantly impacted by climatic changes. In the case of Vunidogoloa, it was the village themselves who initiated the relocation through approaching the government. In Denimanu the houses that were relocated had been destroyed by storm

surges and as such assistance in building new houses was paramount. As such, each of the case studies had overarching and significant levels of appropriateness in terms of projects targeting an issue relevant to the communities. The appropriateness can be exemplified by the following: *"We were so fearful because of the tides living at the old site. We were happy to move away from that fear"* (Vunidogoloa FG).

3.7.2 Limited Equity

The equity evaluation criterion speaks to the 'inclusion and benefit of project interventions for everyone within the community, specifically with regards to any potentially marginalised groups.' As such, equity includes two key aspects. First, to the 'benefit' of projects, in respect to whether there was a level of inequity of who benefited from the projects. Second, in terms of access to consultations, and decision-making processes in reference to the 'inclusion' of people in the projects. Regarding whether people from case study communities were 'included' in the projects, there was no direct exclusion of any members of the community. For example, with consultations, when they did occur, were always targeted to the 'whole' of community. As such, it could be viewed that projects were equal in that they did not intend to exclude anyone in accessing or involvement in projects. While everyone was invited to participate, due to underlying cultural norms in terms of decision-making structure, it was often the case that men were involved in consultations, and women and youth excluded. This is exemplified and represented by the following quote from a women's FG: "*We would like to say that the men don't consult us… When the men say we have to go, we have to go. If they say we have to relocate, we relocate*" (Denimanu FG).

3.7.3 Adequate Efficacy

Efficacy refers to 'the extent to which the project, and relevant interventions has achieved its intended objectives, and included the products, capital goods and services which resulted directly from the interventions.' In the two case study locations new houses were successfully constructed for affected people in the new location. In saying that, while there was provision of these goods and services, there were issues that arose across both locations that project components were not implemented to the full extent of what was initially negotiated or defined in the project description. For example, while houses were built in the new sites, in both villages there were aspects of the project that were not complete. Drainage systems were not built in both communities. In Vunidogoloa, while livelihood provisions were provided to

the community (crops, cattle, and fish ponds), the amount promised was not: "*Just to give an example, the pineapple farm, the Ministry of Agriculture promised we would be given 48,000 tops but they only gave 5000. This is just an example, for the fish ponds they told us they were going to dig eight they only gave four*" (Vunidogoloa FG, Men).

3.7.4 Variable Impact and Sustainability

Here the project was explored in terms of the impact, 'the direct or indirect, intended or unintended, long term effects of the interventions; both positive and negative' and sustainability, 'the extent to which project interventions have been maintained and endured post project lifecycle, and the extent to which processes have continued once the initial inputs, including funding, materials, and training have ceased', both indicating the outcomes of the project. There were some successful impacts resultant from the project in that the villages moved further away from the areas of high exposure and thus through relocating have successfully reduced this exposure. This has had significant positive impact on community members, namely in the case of Vunidogoloa, as represented by this quote from the village: *"We were so fearful because of the tides living at the old site. We were happy to move away from that fear"* (Vunidogoloa FG).

In Denimanu, while the project had positive impacts for some in moving them away from coastal pressures, they were relocated to an area where they experienced high levels of exposure post the relocation. Therefore while there were some elements of positivity from the project in that people were removed from the threat of coastal pressures, this was negated by the move to an area where people felt unsafe: "*So when it rains heavily the whole house is wet . . . overall it is just poor because we have water seep through the door frames and go inside so it rusts and then you can't open the door*" (Denimanu FG). Further, in the relocation site of Denimanu women expressed concerns over having to personally clean out the sewage due to the limited and poor infrastructure in the new village location.

These negative impacts have raised questions for people in Denimanu about the sustainability of the relocated site. For example, the houses in Denimanu leak during heavy rainfall events which is a major issue considering the tropical location. In addition, people in Denimanu feel

they will have to move again in the future due to the threat of erosion and poor housing conditions.

3.8 What Lessons Can Be Taken from These Case Studies Going Forward?

Relocations resulting from climate change and associated impacts are likely to significantly increase into the future (Ferris 2015). As early cases of planned relocation, these two examples provide an important avenue to take lessons that can be applied to future relocation efforts in order to move toward more effective, beneficial and sustainable outcomes for relocated communities. This is especially relevant in a Fijian context as at least 80 communities have been earmarked for relocation but can also apply to other comparable island communities.

Participatory decision-making process is the first theme that emerged from the case studies. Namely, the lack of involvement community members expressed they had in the decision-making pertaining to the relocation. The importance of such a participatory process has been outlined by researchers (Correa, Ramirez and Sanahuja 2011; de Sherbinin et al 2011; Ferris 2015; Kingston and Marino 2010; McAdam and Ferris 2015; McNamara and des Combes 2015) as well as in the established international guidelines (UNHCR 2015) and the Fiji guidelines for relocations (Fiji Government 2018). Yet as we see from these case studies, communities expressed that transparency throughout the process was lacking, specifically in the case of Denimanu. The process employed can be seen as consultation rather than participation, of which a distinct difference exists (McAdam and Ferris 2015). While communities in both villages were consulted (in that they were instructed about the relocation), there was an expressed lack of comprehensive participation, through which communities felt they were not able to significantly contribute to decision-making processes. Including affected communities throughout the relocation process, to ensure the opportunity for self-identified priorities is essential if affected communities are to have the possibility to not only rebuild but also improve their livelihoods in the relocated site (Kingston and Marino 2010; McNamara et al 2018a). Building on top of this, through the planning stage of relocation critical concepts of human rights, dignity, equity, and sustainability should be closely considered and applied (Henly-Shepard, McNamara and Bronen 2018). For example, while processes must aim to include local perspectives, they must further intentionally aim to include multiple and diverse

groups within the process to ensure there is an equitable avenue for a range of perspectives to be expressed.

Long term monitoring and evaluation is the second theme that emerged. There have been numerous issues that have arisen since the relocation, expressed in both villages. These span issues with water leaking into homes, incomplete drainage systems, inadequate sewage, and safety concerns from erosion. Unforeseen outcomes, even with appropriate planning and forethought, would not be unexpected when implementing such large-scale adaptation interventions. As seen in these two cases, these issues that have arisen have not been rectified. Further, both villages expressed that contact with the government since the relocation has been limited with no formal avenue available to express ongoing concerns. Without a level of reflection and a willingness to rectify errors then there is a genuine concern that these unintended negative outcomes could lead to maladaptation, in that there is an increase in community vulnerability in the long term. As such, incorporating formal mechanisms through which village members can express such concerns and ensure a level of accountability is seen as essential going forward.

Targeted livelihood planning is the third theme that emerged. Vulnerability to climate change goes beyond solely a reduction of exposure to physical hazards and includes improving livelihood resilience (Jackson, McNamara and Witt 2017). The relocation of vulnerable communities should be used as an opportunity to not only reduce physical exposure to climate threats, but also build upon other social and economic vulnerabilities and processes (de Sherbinin et al 2011). In Vunidogoloa, the provision of livelihood alternatives in the new sites (such as pineapple plantations, fish ponds, and cattle) improved outcomes across natural and financial capital, with further improvements of access to assets from moving closer to the main road. This is an example of how improving services, assets, and availability of resources is one avenue through which positive outcomes from relocation can be achieved. As such, a focus on this aspect of relocation, in not only reducing the physical threat of climate change hazards communities are facing but taking a holistic view of community vulnerability and ensuring that relocation aims to improve upon the livelihood resilience of affected communities, should be considered as an essential part in achieving success during the relocation process.

3.9 Conclusions

This research documented the experiences of two communities that have been relocated as a consequence of climate change related impacts. The two case studies showcase differences in the contexts around relocation with Vunidogoloa, labeled as the first 'climate-induced' relocation, being a full village relocation resulting from slow-onset impacts. Garnering much less attention, the second case study, Denimanu, was a partial village relocation from sudden-onset impacts. The outcomes of the relocations have shown several positive outcomes, namely in relation to improved housing, and improved access to electricity and facilities. Yet for some residents, these have been somewhat overshadowed by many negative outcomes. For example, serious concerns were raised pertaining to the quality of housing in Denimanu with water leaking through walls. Further, impacts resultant from poor design of sewage septic tanks in Denimanu, and drainage systems in both villages are of concern. This is especially the case in Denimanu where these have led to increased levels of exposure to new threats surrounding mass movement of sediment. The results from this research further indicate wider implications across how women and men experience planned adaptation, both in terms of access to decision-making and on resultant outcomes on lives and livelihoods.

As planned climate-induced relocations will become more common in the future, key lessons from people's experiences in these two case studies are presented that should be built into future planning going forward. These lessons include: Inclusive decision-making processes, as communities felt they did not have adequate input and agency in the process; long term monitoring and evaluation to ensure an avenue is provided for people to voice concerns and issues that have arisen from the process; and targeted livelihood planning to improve livelihoods with the aim of reducing overall vulnerability. Relocation of entire villages is a complex and significant undertaking, so it is imperative that governments and external parties involved in the process take appropriate steps to ensure the process serves to improve the livelihoods and lives of those directly affected.

4.0 Protection: Seawalls as a case of maladaptation on Vanua Levu Island, Fiji

"We face today new dangers from climate change projects and policies as much as we do from the effects of climate change itself"

Courtney Work et al 2018 –

Place of Chapter in thesis

This chapter presents the second case study of this thesis (as shown in Figure 11). This case study looks into the planned retreat (or relocation) of two communities. This chapter contributes to both research aims 2 and 3.

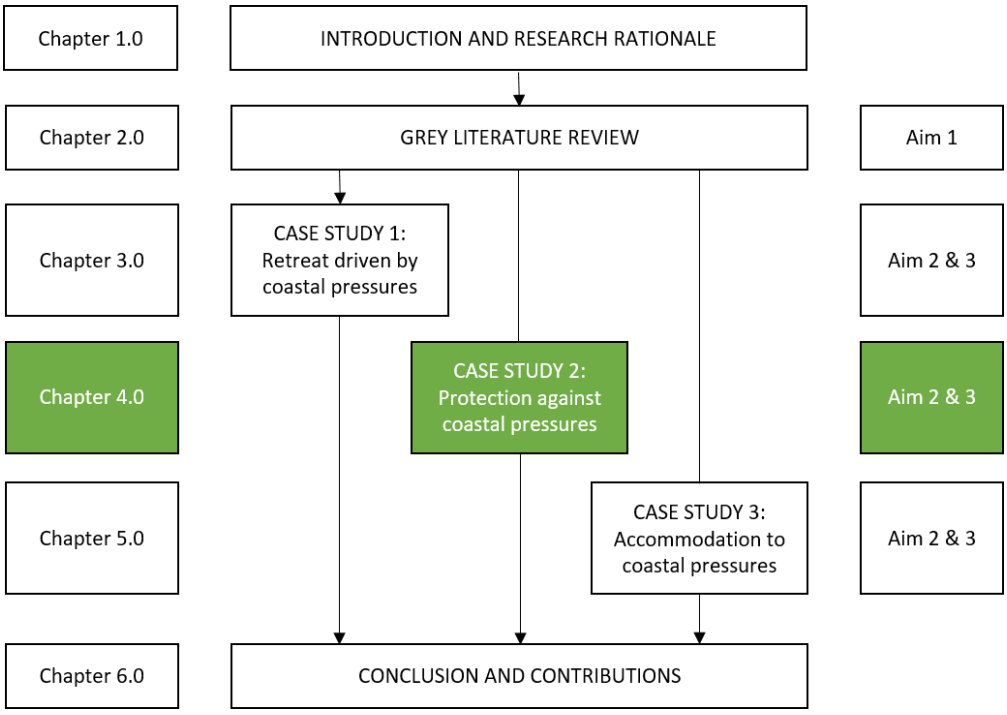


Figure 11: The place of chapter 4.0 in thesis.

Aim 2: Explore the effectiveness of climate change adaptation projects implemented in rural coastal Pacific Island communities in reducing the vulnerability of target communities, across the tripartite of responses: retreat, protect, and accommodate (linked to Chapter 3.0, 4.0, 5.0, and 6.0)

Objective 2a: Evaluate the outcomes of projects from community perspectives in terms of project appropriateness, efficacy, equity, impact, and sustainability;

Objective 2b: Identify dominant barriers to achieving successful adaptation in case study sites.

Objective 2c: Identify if projects have successfully reduced the vulnerability of target communities, and why/why not;

Aim 3: Provide recommendations and insights into both the effectiveness of climate change adaptation in reducing the vulnerability of rural coastal communities (linked to Chapter 6.0)

Objective 3a: Drawing on the case studies, elucidate what factors contributed to the success, or failure, of planned adaptation;

Objective 3b: Explore opportunities through which adaptation can be targeted to improve the outcomes for rural coastal communities in Pacific Islands

This chapter has been written as a manuscript and is currently in press as a book chapter for the publication, *Managing Climate Change Adaptation in the Pacific Region*, with some additions made in the version included in this thesis, as stated:

– Piggott-McKellar, A.E., McNamara, K.E., Nunn, P.D. and Sekinini, S.T. In Press. *Dam(n) seawalls: a case of maladaptation in Fiji.* In Leal Filho, W. (Ed) Managing Climate Change Adaptation in the Pacific Region. Springer, Cham.

Statement of Authorship for this Chapter

The conception and design of this chapter was undertaken primarily by the candidate (80%) and in part by Patrick Nunn (20%). The analysis and interpretation was undertaken primarily by the candidate (80%) with assistance from Seci Sekinini (20%) who acted as translator and research assistant during fieldwork. This chapter was written solely by the candidate (100%) with editing done by the candidate (20%), Karen E. McNamara (40%), and Patrick D. Nunn (40%).

Abstract

Coastal communities in PICs are particularly vulnerable to climate change impacts including sea-level rise, coastal erosion, tidal inundation, and the intensification of storm surge activity. In response, adaptation projects across the region have attempted to reduce exposure and overall vulnerability to these coastal pressures. This paper explores what happens once these projects reach communities: are effective and sustainable outcomes achieved, or can the implementation of adaptation projects lead to unintended negative outcomes and result in maladaptation? This paper investigates this issue in relation to two seawall projects implemented in communities on Vanua Levu Island, Fiji. We found that the seawalls have not been successful in achieving their primary aim of safeguarding communities against coastal pressures and have instead resulted in unanticipated negative outcomes for land and livelihood security. Of primary concern is the way that seawalls trap water along their landward sides – acting more like a dam – because of the ineffective design and construction of the seawalls and associated infrastructure. This paper concludes with a call to think more long-term about site-specific adaptation measures that actively involve and are driven by local perspectives in the planning, implementation, and maintenance process.

4.1 Introduction

4.1.1 Vulnerability to climate change in Pacific Island Countries

PICs are often depicted as one of the most vulnerable regions to climate change (Beyerl, Mieg and Weber 2018; Warrick et al 2017). Despite such assertions, there is no universally used and recognised definition for vulnerability to climate change (Füssel 2007). The most recent definition by the IPCC exemplifies this ambiguity, defining vulnerability as "The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt" (IPCC 2014a: 1775). Despite such definitional ambiguities, there persists a general informal acceptance that vulnerability refers to the exposure of a system coupled with the potential to be harmed (Jackson, McNamara and Witt 2017; Tu'akoi et al 2018). As such, vulnerability to climate change can refer to both the severity of climate related impacts (i.e. sea-level rise, increased storm surge activity, tidal inundation), coupled with the propensity of people/places to be harmed by such climatic impacts, which can be broadly understood by susceptibility (i.e.

institutional, social, historical, economic) and adaptive capacity (i.e. local knowledge, access to information and assets, social capital).

Climate change impacts are already being experienced and projected to increase into the future, with evidence that state-of-the-art climate models are underestimating the severity of future impacts (Schewe et al 2019). Climate change impacts experienced most severely in PICs include the increased intensification of storm surge activity; sea-level rise and subsequent increased tidal inundation; shoreline erosion and groundwater salinization; changing fish stocks; and less predictable rainfall patterns (Barnett 2011; Chand et al 2016; IPCC 2014c; Kumar and Taylor 2015). These impacts are likely to increase in severity into the future more than necessary owing to the lack of international action on reducing atmospheric GHG quantities through reducing emissions or increasing carbon sinks. Despite PICs being heterogeneous in culture, society, governance, histories, and economy, they are often depicted as a homogenous entity at the forefront of these impacts owing to the similar characteristics that PICs share which enhance their propensity for harm. Such shared characteristics include generally high coastline to land mass ratios and mainly coastal settlements, direct dependence on climate sensitive sectors (such as fishing and agriculture), comparatively low incomes coupled with limited economic opportunity, distance from resource bases and population centres, and inefficient infrastructure. It is this confluence of factors that make PICs recognised as some of those places in the world that are most vulnerable to a changing climate.

While PICs are depicted as highly vulnerable to climate change, such a depiction presents a simplistic notion of vulnerability. Primarily, it disregards the internal adaptive capacity and resilience of island communities and their traditional knowledge systems and coping strategies that have long guided people through extreme environmental changes such as resource constraints and changes in sea-level (Barnett and McMichael 2018; Bridges and McClatchey 2009; Granderson 2017; Lefale 2010). Further, the notion of Pacific Island vulnerability can serve to sideline more intricate aspects that play into vulnerability. Owing to access to resources and developed infrastructure and economies, people in core centres, as opposed to peripheral communities, have differing levels of vulnerability (Nunn et al 2014; Nunn and Kumar 2018; McNamara et al 2018b). This can also play out in terms of the class, ethnicity,

gender, status, or age of a person which can impact their access to information, availability of resources, employment opportunities, and education, all of which can amplify individual and community vulnerability.

4.1.2 Climate Change (mal)adaptation

Adaptation to climate change refers to reducing the vulnerability of a system to experienced or anticipated climate change impacts (Barnett and Campbell 2010). As climate change impacts are progressively felt, and projected to become increasingly visible and impactful, it is clear that adaptation policies and projects have been implemented with haste. The depiction of PICs as vulnerable has resulted in significant funding being directed to the region. For example, between 2008 and 2012 adaptation finance to the Pacific Region was just under USD $80 million per annum (Donner, Kandlikar and Webber 2016). Adaptation implementation comes largely through bilateral funds, and large multilateral funding schemes funded by developed countries and implemented by local governments and NGOs (Spires, Shackleton and Cundill 2014). A recent review of adaptation in SIDS, of which all PICs identify, shows that documented planned adaptation fit into three categories being structural or physical (i.e. engineering and infrastructural); social (such as educational, behavioural, or informational); or institutional (governance and policies, and law and regulation), with infrastructural and behavioural dominating (Klöck and Nunn 2019).

While there has been increased activity in implementing planned adaptation, whether adaptation is actually reducing the vulnerability of communities has often been questioned (Adger, Arnell and Tompkins 2005; Barnett and Campbell 2010; Nunn et al 2014). As almost all of the funding for adaptation comes from developed countries (Nunn 2013), often project objectives are developed by development and donor organisations and agencies. This has resulted is questions being raised about the relevance of such projects to local social, economic, and cultural contexts (Barnett and Campbell 2010; Kumar 2015). Yet, evaluating the success of adaptation in PICs is challenging owing to differing perceptions of what success means, a lack of longitudinal data, and the oft-limited prioritisation of evaluation (Buggy and McNamara 2016; Dumaru 2010; Klöck and Nunn 2019; Remling and Veitayaki 2016). Evaluations of adaptation projects that have been undertaken across the region have shown at times failed outcomes. For example, an analysis of the World Bank KAP showed that it was

deeply flawed in its design and relevance to the nation's institutional framework and local capacity (Dean, Green and Nunn 2016). A study in Vanuatu found that adaptation projects have often been unsuccessful resulting from the community viewed as a homogenous entity and not accounting for the nuances and variation in local hierarchies, decision-making processes, and social dynamics (Buggy and McNamara 2016). Aside from the ambiguity of success of project outcomes, there have been broader questions raised about whether a reliance on external aid for adaptation by PIC governments has reduced capacity to independently adapt and diverted attention away from more pressing development needs (Barnett 2008; Webber 2013).

Such concerns about the potential for perverse outcomes from adaptation policies and projects have resulted in a growing scholarship on maladaptation. As Work, Rong, Song and Scheidel (2018: 13) state, "We face today new dangers from climate change projects and policies as much as we do from the effects of climate change itself". Challenges in defining exactly what maladaptation is have been raised (Juhola, Glaas, Linnér and Neset 2016). First, it is important to make the distinction between 'null adaptation' where adaptation has no direct benefit in reducing the vulnerability of the targeted population, as opposed to maladaptation which inadvertently increases vulnerability. Barnett and O'Neill (2010: 211) define maladaptation as an "action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups". A further definition proposed by Juhola et al (2016: 139) building off this previous definition, states that "maladaptation could be defined as a result of an intentional adaptation policy or measure directly increasing vulnerability for the targeted and/or external actor(s), and/or eroding preconditions for sustainable development by indirectly increasing society's vulnerability".

Due to the relative early scholarship on maladaptation there have been some ambiguities as to what maladaptation actually means in practice and thus how to identify and measure it. In a manner to develop understanding, Barnett and O'Neil (2010) identify five pathways through which an adaptation can be defined as maladaptive; if the adaptation action: 1) increases GHG emissions, 2) disproportionately burdens the most vulnerable, 3) has high opportunity cost, 4) reduces the incentive to adapt, and 5) creates path dependency. Juhola et al (2016) advance

the scholarship in maladaptation through providing a typology that allows the assessment of actions as maladaptive as either rebounding vulnerability, shifting vulnerability, or eroding conditions for sustainable development. Taking an *ex ante* approach, in trying to answer under what conditions maladaptation can occur, has become prevalent in the literature. Identifying the potential risk that maladaptation may occur by decision-makers early in the planning process has been documented as an important step in working to avoid the potential of maladaptation occurring (Magnan et al 2016). While this is undoubtedly an important step, Work et al (2018) have shown that development partners will often ignore potential detrimental social and environmental impacts, thus not implementing practices to reduce these from occurring, and leading to maladaptation. Further, Owusu-Daaku (2018) argues that adaptation, can be overtaken and perpetuated by actors with underlying or adverse economic interests, and as such maladaptation is a product of a myopic focus dominated by a few actors, positing the term 'maladaptive opportunism'.

4.1.3 Coastal protection measures

To adapt to coastal pressures resultant from sea-level rise and associated impacts there are often three categories of initiatives employed: accommodation measures that allow people to adapt in situ, for example, by raising infrastructure; protection measures that employ some form of coastal defence; and retreat which involves the movement of people away from the shoreline (Williams et al 2018). Coastal protection measures (which are the focus of this research) can be broadly categorised as soft or hard. Soft measures refer to the use of natural materials such as mangroves or other natural vegetation that act as a natural defence buffer while hard measures refer to built infrastructure (Pilkey and Cooper 2012). Hard measures range from locally built ad hoc defences using available materials such riprap, machinery, or boulders, to the construction of planned seawalls or revetments (Shand et al 2017), in many instances funded through donor funded projects.

Concerns about the suitability of seawalls and revetments implemented in rural settings in developing countries have been expressed. For example, conventional seawalls implemented in a PIC context have been identified as only 'moderately' resilient to climate change impacts with societal outcomes typically average to poor (Shand et al 2017). Further, the changing dynamics of small islands through natural geomorphic processes coupled with oft-limited

scientific knowledge of these locational process can render seawalls and other hard infrastructure inappropriate (Kench 2012). The longevity of seawalls for coastal protection is another challenge as recipient country governments or beneficiary communities have neither the commitment nor the resources to maintain the infrastructure beyond the period of project funding (Nunn 2013). Concerns with seawalls go deeper than an inability to protect rural coastal areas as they represent a more archaic perspective of adaptation through reducing vulnerability to hazards while not acknowledging underlying socio-economic and other contextual drivers of vulnerability.

Despite the ineffectiveness of seawalls there remains a trend within rural areas in particular of PICs, where seawalls have been uncritically implemented as a long-term coastal protection measure (Nunn 2009; Nunn 2013). One reason for this trend is that most coastal protection measures in PICs come from donor countries, causing replication of coastal protection measures from wealthier, often continental countries. As Dean, Green and Nunn (2016: 87) state "there is a naïve and misguided belief of many donors that hard shoreline structures along Pacific Island coasts are the most effective and enduring long-term solutions to shoreline erosion". There appears an allure for donors in building a seawall as it can on the one hand provide initial (yet short-term) comfort to communities, as well as provide a visible outcome suitable for reporting purposes. Softer adaptation measures, such as long-term skills training or meaningful community education building, while requiring more commitment and less observable reward, have been shown to have an increased positive impact for growing adaptive capacity in such situations (Williams et al 2018).

4.1.4 Research aim and questions

Seawalls and revetments have been, both implicitly and explicitly, noted as ineffective and unsuccessful coastal protection measures in PICs (Karlsson and Hovelsrud 2015; Klöck and Nunn 2019; Nunn 2009). While they are acknowledged as unsuccessful long-term coastal protections measures, further questions about the maladaptive potential of seawalls have been raised (Barnett, Waller, Rogers and O'Neil 2013; Dean, Green and Nunn 2016), in that not only are they unsuccessful but that they can serve to inadvertently increase vulnerability.

With this context in mind, the aim of this research is to examine, through empirical evidence, the outcomes and implications of seawalls on lives and livelihood security. The experiences from two communities – Karoko and Korotasere – on Vanua Levu Island, Fiji who were recipients of seawalls through a donor funded adaptation project, guide this research. This research aims to answer the following questions:

1) How, if at all, have seawalls successfully reduced exposure to coastal pressures for communities?
2) How, if at all, has community land and livelihood security been affected by the construction of seawalls in their communities?
3) Should seawalls be seen as a case of maladaptation to climate change?

This paper first provides an overview of the two case study sites and project background, followed by the methods undertaken. Next, an exploration of the outcomes and implications of the two seawalls in both reducing exposure to coastal pressures, as well as exploring the implications on community livelihood security is provided, showcasing that both the seawalls have not been successful in providing coastal protection and have inadvertently increased the vulnerability of the community due to poor seawall design and construction. A final discussion surrounding the maladaptive nature of seawalls in rural PIC communities, and discussion of more appropriate options to move toward appropriate and sustainable adaptation is presented.

4.2 Case study sites and project background

Fiji is an archipelago situated in the South West Pacific Ocean and home to 330 islands, with Vanua Levu the second largest (Viti Levu being the largest). Approximately 15% of the total 900 000 population live on Vanua Levu. In total, roughly 45% of inhabitants of Fiji live in rural areas, which has declined from 70% in 1960 (World Bank 2018). The case study sites for this research are two villages, Karoko and Korotasere, located on Vanua Levu Island (see Figure 12). Like most rural areas in Fiji, both villages are coastal and largely subsistence-based relying heavily on marine and terrestrial resources for their livelihoods. Karoko is a significant distance from

the nearest town center, Savusavu while Korotasere is situated much closer to Savusavu. A bus services both villages along the only road serving that area.

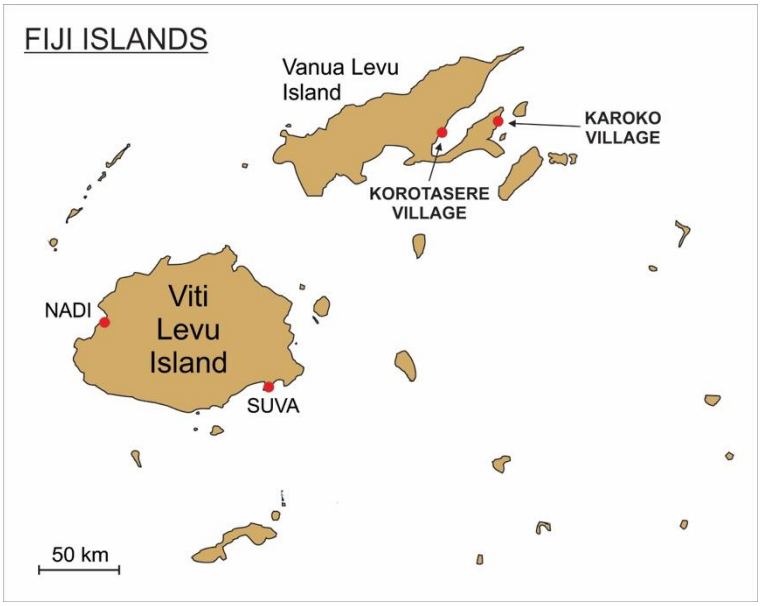


Figure 12: Map of the two case study sites - Karoko and Korotasere - on Vanua Levu Island, Fiji

Research into climate impacts in the Pacific Region over the past few decades show that increases in sea-level have been occurring over the last 150 years and are projected to increase up to 80cm above the 1985-2005 mean by 2100 (Church et al 2013). Alongside this, increased surface temperatures and strength of El Niño and La Niña cycles mean that there is likely to be an increase in cyclone intensity creating more impactful storm surges (Walsh et al 2016). For coastal communities, this means an increased threat of flooding events that can impact livelihoods. Both case studies in the research have a history of flooding in the village. In Karoko this has become exacerbated in recent years as an elderly member of the village explained: "*When I was small we didn't have as much high tide and the village never flooded. But now we see a lot of change*" (Karoko FG).

As both villages have been facing impacts from flooding, there was a desire within the villages for some form of coastal protection measure. In Korotasere a seawall was specifically requested by the village. In Karoko, while there was a desire for some type of coastal protection, a seawall was one option that had been discussed in the village, alongside relocation. Despite this lack of consensus, the implementation of the seawall was welcomed by the village: "*We don't know how to start at a new place so a lot of people lean toward the*

seawall rather than relocate… we felt good that the seawall was going to be built" (Karoko FG). This desire of a seawall is representative of the feelings of safety that can be garnered by having a physical structure in place (Lincke and Hinkel 2018). In Karoko the seawall was along the coastal side of the village, while in Korotasere the seawall was constructed along the river.

Both seawalls were funded through USAID under the C-CAP and implemented in both communities at the end of 2015. In its totality, the project was implemented in numerous communities across nine countries throughout the Pacific region, in consultation with respective governments and local partners. The actual construction was undertaken by a local contractor. One of the project's primary objectives is to implement infrastructure adaptations to withstand climate change impacts and increase community resilience. In both Karoko and Korotasere, this resulted in the construction of seawalls in the communities. In both Karoko and Korotasere, this resulted in the construction of seawalls in the communities.

4.3 Methods

The research team consisted of the lead author, who led the discussions with the community members, and the fourth author who helped with translation and independently led discussions, playing a pivotal role in the research process. A local provincial representative acted as gatekeeper for the research team, contacting and arranging site visits with both villages ahead of time. This was done to arrange an appropriate time to visit and ensure that community members were willing, available, and prepared for FG discussions. Ensuring this initial contact is done in an appropriate and respectful manner that is in line with the cultural and societal norms is an essential step in the research procedure when working in PICs. While people who have worked in this region are well aware of the importance of this, the following is presented as a cautionary tale for others. In one of the villages participants noted that another research team had recently arrived unannounced at the village to talk to people without any prior arrangement. They arrived on a Sunday, this being a day of prayer for island communities. As such the community members were not impressed with this visit and stated they refused to talk to them.

Field visits were undertaken during November and December 2017. In Karoko, the village was visited over a two-day period with two formal FG discussions occurring, one women's FG and

one men's FG. This was also hoped to occur in Korotasere although on the first day the research team found a funeral was planned for the following day and, as such, only one day was spent in the village and as such one FG was undertaken with a combination of men and women. Site visits to inspect the seawalls as well as walk around the village were also undertaken. Ethical procedures were followed in which participants were given details of the research and asked to sign a consent form. Each FG was recorded with permission from the participants. The qualitative data collected from the field visits was later transcribed and a content analysis undertaken where information was coded according to FG questions to elucidate common responses and experiences.

There were some limitations experienced in this research. Of note was the limited time spent in Korotasere, with only one day spent in the village. Yet, this was unavoidable owing to the unanticipated funeral proceedings planned for the following day, and the time constraints of the researchers. Second, as this research uses qualitative data, there is an assumption that information presented by village participants is true and honest to their individual experiences. Yet, there is potential bias, such as positive response bias or social desirability bias, when implementing such experiential qualitive methods (Bryman 2008). Finally, there can be challenges associated with the translation of words from the local language into English and *vice versa* (Rudiak-Gould 2012).

4.4 Implications and outcomes of seawalls for communities

With the aim of understanding and evaluating the success of adaptation, this must be done in terms of both reducing exposure from climate related hazards, as well as the outcomes on livelihoods, as this plays an important role in adaptive capacity. As such, the implications of the seawalls for affected communities will be explored below in terms of how well the seawalls have reduced exposure to coastal pressures, as well as how the seawalls have impacted community land and livelihoods particularly livelihood security.

4.4.1 Reducing exposure to coastal pressures?

The implementation of the seawalls in both communities was done with the aim of alleviating climate related coastal exposure from increased flooding, tidal inundation, and coastal erosion. Yet, both seawalls were not successful in alleviating these pressures for all members of the

community, namely those situated at the front of the village, closest to the seawall. Community members from both Karoko and Korotasere stated that the construction of the seawalls was not adequate as the length did not go far enough and as such water can still enter the village around both ends: "*The end of the seawall, the water comes around it. And it's not done properly. It's not just one end, it's both ends*" (Karoko FG). There were also concerns raised in both villages that the construction of the drainage systems associated with the seawalls was ineffective. These concerns with the infrastructural design are, unfortunately, not unique to these two case studies. Such concerns with incomplete and inadequate design of infrastructure have been noted across the adaptation literature. For example, in a recent review of barriers to effective community level adaptation, challenges associated with infrastructure were noted in 32% of cases examined (Piggott-McKellar, McNamara, Nunn and Watson 2019b).

Infrastructural projects have been noted to be inadequate in many rural areas that lack access to resources to maintain projects, especially when mechanisms to do so are not accounted for and in-built into project design through maintenance training or improving access to resources. In this instance community members have noted that the seawalls have been breaking down in some sections, predominately through rocks falling out of the structure. While these concerns were noted in both villages, such issues have not been rectified. This is owing to communities both having insufficient funds or expertise to solve the problem themselves, but also because they perceive the seawalls as an outside project, the responsibility of the government and other external stakeholders to maintain for the communities benefit.

As a result of the poor design and incomplete infrastructure in both villages, some deleterious outcomes for members of the community have occurred. Water still enters the village as it goes around the seawall, thus not substantially reducing flooding events, one of the primary tasks it was implemented to do. A further associated issue occurred due to the drainage system being built too high, resulting in water having no way to escape once it has entered the village, from both tidal flooding events and heavy rainfall. As such, water is trapped on the landward side of the villages, thus acting like a dam. This issue was brought up in both villages: "*Since they have built the seawall the outcome is that the water is not flowing out, it is getting blocked by the sea wall… the idea of a seawall is for water to stay outside, and that doesn't work here*"

(Korotasere FG), and "*So our house on the first row, we will be sitting inside the house on top of the water, flooded, and we will be staring at the pipe nice and dry. We will be watching the water collecting inside the seawall and not going out*" (Karoko FG).

While benefits from the seawalls have been experienced by some community members in that they have reduced the extent of tidal wave surges, owing to poor design and construction of infrastructure, the seawalls have overall been unsuccessful in alleviating coastal pressures in either village. Rather, inadvertent outcomes stemming from poor infrastructural design and implementation have meant water is now trapped inside the village, acting more like a dam.

4.4.2 Implications for land and livelihood security

As described above, the seawalls have not been successful in achieving their goals in reducing exposure to coastal flooding and tidal inundation experienced in both communities. Yet, in addition there have been further inadvertent outcomes on community lives and livelihood security. It was expressed by a participant whose home was close to the front of the village that as the spill over and rain water is retained inside the village, challenges in maintaining their gardens has occurred, resulting in a loss of income: "*the vegetables we grow sometimes we will take to the market and sell, or sell around the village. Now we don't have this source of income and are buying vegetables that is taking a lot of our own money*" (Karoko FG). This is especially pertinent because the limited economic opportunities in both villages due to their distance from core centers, and thus constrained market access.

In a feasibility analysis of coastal protection options across Pacific Islands, Shand et al (2017) note that one common downfall of seawalls and revetments is that they can reduce beach access for local communities, especially if infrastructure is built without this consideration in mind. This challenge arose in Karoko (where the seawall was built on the coastal side) with beach access reduced for community members: "*Also there was another issue, because they put the steps in the middle of the sea wall and when its flooded sometimes we have to swim to the stairs to get down to the beach instead of just going down like before"* (Karoko FG). Further people expressed that fishing nets are getting caught on the seawall and that it has overall resulted in a negative impact on livelihoods: *"this seawall has become a liability to our children's safety, it damages our nets, our livelihoods are being affected*" (Karoko FG).

Seawalls are often seen as a desirable coastal protection measure for local communities as they present a physical level of comfort, at least initially, that makes people feel safe from increasingly experienced coastal pressures (Morris et al 2018; Jamero, Onuki, Esteban and Tan 2018). Korotasere has been asking for a seawall for roughly eight years, prior to this one being implemented, and both communities experienced an initial desire and happiness with the projects in their villages. However, while this is the case, the reality is that while seawalls might present an initial level of comfort, they are invariably an inadequate long-term option for rural communities. This can be shown as over time, due to the negative impacts associated, people have not garnered as sense of safety: "*yes, initially we were happy but it didn't serve its purpose*" (Korotasere FG), and "*So we always have the same feeling like before the seawall was built. Worries and anxiety*" (Karoko FG).

Acknowledging and not undermining the negative outcomes experienced from the seawalls, there have been some more positive outcomes experienced by community members. For example, some people feel the seawall has protected them experiencing the full impacts from large scale tidal surges: "*yes we will be grateful still because at least it stops most of the water and wave surges… but there is still some that gets in around the seawall"* (Karoko FG). Some practical outcomes in terms of the seawall infrastructure allowing easier access to fishing at high tides as people can stand on the seawall, as well as using the sea wall as a place to socialise, as one participant noted: "*And we use it a lot for site seeing because we walk along the sea wall. We take our guests out there and walk around*" (Karoko FG).

4.5 Community evaluation of the adaptation project

This section (4.5) is an addition the publication and has been included in this thesis to satisfy research objective 2a. *evaluate the outcomes of projects from community perspectives in terms of project appropriateness, efficacy, equity, impact, and sustainability.* As such the following section evaluates the projects across these criteria.

4.5.1 Moderate levels of Appropriateness

Appropriateness is referred to as 'the overall relevance of the project and associated suitability of the intervention in terms of community priorities and their cultural and social ethos'. In

regard to the community's perspectives, the seawalls in the case study locations were appropriate. In both Karoko and Korotasere there had been increasing flooding occurring in the village which was impacting the lives and livelihoods of local people. As such, the construction of seawalls was appropriate and welcomed as viewed by local villages: "*We don't know how to start at a new place so a lot of people lean toward the seawall rather than relocate… we felt good that the seawall was going to be built*" (Karoko FG). In Korotasere, the village had actually been asking for a seawall for numerous years. As such, each of the case studies had overarching levels of appropriateness in terms of projects targeting issues relevant to the communities.

Despite this broad scale appropriateness of projects to current and future threats of climatic changes, looking deeper into the appropriateness of projects in the context in which they were implemented and the associated intricacies, a different picture begins to emerge. For example, the implementation of seawalls as a protection measure in rural Pacific island communities has to be deeply questioned as they have shown to be ineffective in such contexts (Dean, Green, and Nunn 2017). While the concept of a seawall is attractive to local rural communities who believe it will successfully reduce exposure to coastal pressures (Morris et al. 2018, Jamero et al. 2018) this gives a false sense of hope and security when in actual fact a more appropriate response, for example relocation, might be necessary.

4.5.2 Nonexistent Equity

The equity evaluation criterion speaks to the 'inclusion and benefit of project interventions for everyone within the community, specifically with regards to any potentially marginalied groups.' As such, equity includes two key aspects. First, to the 'benefit' of projects, in respect to whether there was a level of inequity of who benefited from the projects. Second, in terms of access to consultations, and decision-making processes in reference to the 'inclusion' of people in the projects. In this case study, the first component in regard to project benefits is not as relevant as it was an infrastructural project and therefore everyone benefited equally, with the exception of geographical positioning of houses. In regard to the inclusion of people in the project, there was limited to nil consultation with the community: *"There was no consultation. All they did was they just turned up and say we will do it here and they just do the*

work" (Korotesere FG). As such, while there was no inclusion with the community, it was equitable in that no one was included.

4.5.3 Poor Efficacy

Efficacy refers to 'the extent to which the project, and relevant interventions has achieved its intended objectives, and included the products, capital goods and services which resulted directly from the interventions.' In most part, this case study could be viewed as reasonably successful in this criterion, in that the tangible and intangible goods and services were provided. For example, a seawall was constructed. However, looking more deeply while it was constructed in both Karoko and Korotasere, the length of the seawalls was not to the extent that was originally defined. The seawalls, in both villages, were shorter on both sides than originally defined. In addition, the drainage systems where ineffective in serving their purpose as they did not allow water to flow out. These issues are represented by the following quotes and are representative of both villages: "*The end of the seawall, the water comes around it. And it's not done properly. It's not just one end, it's both ends*" (Karoko FG), and "*Since they have built the seawall the outcome is that the water is not flowing out, it is getting blocked by the sea wall… the idea of a seawall is for water to stay outside, and that doesn't work here*" (Korotasere FG).

4.5.4 Deleterious Impact

Here the project was explored in terms of the impact, 'the direct or indirect, intended or unintended, long term effects of the interventions; both positive and negative'. First it is important to note that as projects were implemented within the five years prior to fieldwork, the long-term impacts cannot be fully accounted for. As such, in the following discussion this time frame should be kept in mind. Negative, unintended outcomes from this project arose in both case study sites. Predominantly, the inadequate construction of the seawalls led to unintended negative outcomes in that the water damns on the landward side of the village and therefore has created problems for the community in terms of livelihoods. For example, sentiments from people that they cannot grow food in their gardens due to water remaining inside the village for longer periods of time. Further implications in terms of access to the beach which is an important livelihood source for community members.

4.5.5 Poor Sustainability

The sustainability of the project, defined as 'the extent to which project interventions have been maintained and endured post project lifecycle, and the extent to which processes have continued once the initial inputs, including funding, materials, and training have ceased', will be explored. This was the worst performing of all the criteria. For example, in the seawall case study, sustainability was evaluated both in terms of how well the seawall has lasted (the sustainability of the infrastructure), as well as whether the seawall has impacted community safety (the sustainability of their lives and livelihoods in location as impacted by the seawall). In this instance, it was noted that there have been some minor issues associated with the longevity of the wall in that rocks are falling out. In regards to the impact of the seawalls on the sustainability of peoples livelihoods in location, in Karoko one village member said: *"the seawall has flooded the village, not climate change… they said we should relocate from climate change, but we said no, we will relocate because of the sea wall*" (Karoko FG).

4.6 A case of maladaptation

Across the literature, the implementation of large infrastructural projects to reduce the vulnerability of populations to adverse climate impacts has been questioned (Adger, Arnell and Tompkins 2005; Dean, Green and Nunn 2016; Girot, Ehrhart and Oglethorpe 2012; IPCC 2011). After analysing the outcomes from the implementation of seawalls in the two case study sites presented in this research, it is clear that perverse outcomes can arise from infrastructural adaptations. Further, this research showed that the seawall projects had unintended negative impacts on both communities. As such it is argued here that seawalls implemented in PIC communities should be recognised as, in the least, having the potential to be maladaptive.

The maladaptive potential of seawalls will be shown, drawing on empirical data from the two case study sites in this research, as well as other literature. We will use the conceptual underpinnings of maladaptation developed by Juhola et al (2016), which has previously been used to evaluate the maladaptive potential of other adaptation initiatives (Antwi-Agyei, Dougill, Stringer and Codjoe 2018). Juhola et al's (2016) framework for assessing maladaptation refers to maladaptation occurring under the conditions of: 1) rebounding vulnerability, whereby the vulnerability is increased for the targeted actor; 2) shifting vulnerability, whereby vulnerability is increased for external actors; and 3) eroding conditions

for sustainable development, whereby maladaptation occurs if an adaptation negatively impacts environmental, social, economic, or cultural conditions necessary for sustainable development. The criteria across each of these can be met by increasing vulnerability through either increasing exposure or susceptibility, or decreasing adaptive capacity (Juhola et al 2016).

Rebounding vulnerability refers to a situation in which a planned adaptation increases the vulnerability of those that the adaptation intervention was implemented to protect. In the case of seawalls, and as this study showcases, perverse outcomes resulted for the communities as a direct result of the seawall projects. In this instance this occurred as the seawalls have not reduced the exposure to coastal pressures, and have inadvertently increased for some village members, specifically those situated closest to the seawall: "*the seawall has flooded the village, not climate change… they said we should relocate from climate change, but we said no, we will relocate because of the sea wall*" (Karoko FG). The implementation of seawalls have also shown to provide a short term, and misleading sense of security. Seawalls are often seen as providing a structurally sound and long-term defence by local communities, when they should be seen as an intermediary activity at most. The expectation of seawalls being a long term solution can divert attention away from adaptation options that can actually reduce the vulnerability of local communities. For example, the time and resources put into building a seawall, which has not had a positive benefit in reducing vulnerability to the community, and has instead added to it, could have been put into a more long-term solution.

The second example of maladaptation is that of shifting vulnerability whereby vulnerability is 'shifted' to another actor. In this instance, drawing on other literature, it can be seen that seawalls can be described as maladaptive under this measure as they can cause downstream unintended negative outcomes through altering natural coastal processes (Shand et al 2017). Seawalls disrupt natural erosion process which usually provide sediment to adjacent coastal areas through longshore drift, thus resulting in the starvation of sediment for locations at these sites (Linham and Nicholls 2010). Dean, Green and Nunn (2016) describe the impacts of a seawall constructed alongside an existing seawall that was already causing erosion, thus perpetuating the problem even further. This can lead to impacts on nearby communities who rely extensively on the coast for their livelihoods, and thus shifting the vulnerability onto them.

The third form of maladaptation is that maladaptation occurs through the erosion of the preconditions for sustainable development. These are seen as common pool outcomes that impact society, rather than specific actors themselves. The construction of seawalls as opposed to other more feasible options has been noted to significantly contribute to GHG emissions, through their construction, thus contributing to and exacerbating climate change (Barnett, Waller, Rodgers and O'Neill 2013). Further, the construction of seawalls as opposed to natural coastal defences, such as mangrove rehabilitation, have direct negative environmental consequences. As Shand et al (2017: 972) notes referring to seawalls, "Environmental impacts are likewise average to poor as the natural system is being interrupted by a fixed structure generally with a large occupation area". While these impacts are more localised, they can also contribute to broader environmental concerns as coastal areas are imperative for the health of local marine wildlife, and alternatives such as mangrove restoration can serve to maintain long-term ecosystem health (Morris et al 2018; Calliari, Staccione and Mysiak 2019).

Viewing seawalls as maladaptive, or in the least having maladaptive potential is an important realisation going forward. As shown here, seawalls can be maladaptive across all forms through rebounding vulnerability on those the adaptation has been implemented to assist, shifting vulnerability onto other actors, and eroding the conditions for sustainable development.

4.7 Conclusions and future directions

PICs are described as some of the most vulnerable to climate change which has resulted in adaptation projects implemented across the region with the aim of reducing this vulnerability. Whether such planned adaptations are effective, in that they successfully reduce local vulnerability, has been appropriately and suitably questioned throughout the literature. Additionally, whether such adaptations are instead increasing vulnerability, leading to maladaptation, has been further raised. This research contributes much-needed knowledge about the potential for planned adaptation to be maladaptive using the case of seawalls implemented in two rural communities in Fiji. The construction of the seawalls was part of a wider adaptation project, C-CAP, which was funded by USAID and implemented across the Pacific region in numerous communities across nine countries. These seawall projects were implemented to assist communities in dealing with high exposure to changing coastal conditions as experienced from climate change.

This research showed that seawalls have been largely ineffective in protecting recipient communities from associated coastal pressures, especially for people closest to the seawall as water is trapped inside the landward side of the village, acting more like a dam. Poor infrastructural design was identified as the primary cause of this as water can enter around the seawall as its length in insufficient and drainage infrastructure has been ineffectively built. As a result, further inadvertent impacts on land and livelihood security have been experienced by some community members. By exploring this case study and other literature, it is clear how seawalls meet all three categories for maladaptation as proposed by Juhola et al (2016), as they: 1) can increase vulnerability for those the seawalls were implemented to protect; 2) can increase the vulnerability of down drift communities; and 3) can erode conditions for sustainable development. Due to these deleterious outcomes, the maladaptive potential of seawalls must be recognised going forward, especially in the context of rural communities in small island nations.

Adaptation is an essential component when dealing with climate change, considering climate change impacts are already being experienced and will continue into the future. This research reveals some important insights into how adaptation is currently undertaken and implemented and raises some important considerations and questions related to who is defining 'good' or 'successful' adaptation. In the case studies presented in this research, seawalls could be seen as successful in that they were physically constructed in both communities, yet the outcomes of these have been deleterious to communities whom the projects were purportedly implemented to assist. If adaptation is to be truly meaningful in reducing the vulnerability of communities most affected, a shift is required pertaining to the processes and decision-making that permeate the current adaptation model which prioritises short-term adaptations that are driven by the perspectives, objectives, and criteria of donors and implementing agencies. For example, hard infrastructural adaptations, especially when implemented in island nations, have been documented extensively to be ineffective, while communities at the frontline of climate change impacts are continuously left out of decision-making processes. As such, a move away from the current focus on tangible short-term responses to long-term adaptations that account for the breadth of factors that influence and drive vulnerability and include and account for the diverse perspectives of those affected is needed. If such a paradigm shift is not

made, there is a genuine risk that planned adaptations will instead increase people's vulnerability above that already experienced by climate change. As such, the authors reiterate and join the call amongst others to plead "for the anticipation of the risk of maladaptation to become a priority for decision-makers and stakeholders at large, from the international to the local levels" (Magnan et al 2016: 661).

5.0 Accommodation: Who defines 'good' climate change adaptation and why it matters: a case study from Abaiang Island, Kiribati

"you have to come here, stay with them, observe them, sleep with them, eat with them, play with them, and then you see their needs because you see their daily life… at that time you can design what project is suitable for them"

Kaboua, Abaiang Island Kiribati –

Place of Chapter in thesis

This chapter presents the third case study of this thesis (as shown in Figure 13). The case study presented in Chapter 5.0 looks into an accommodation adaptation project focus on enhancing food security of two communities on Abaiang Island, Kiribati. This chapter contributes to research aims 2 and 3.

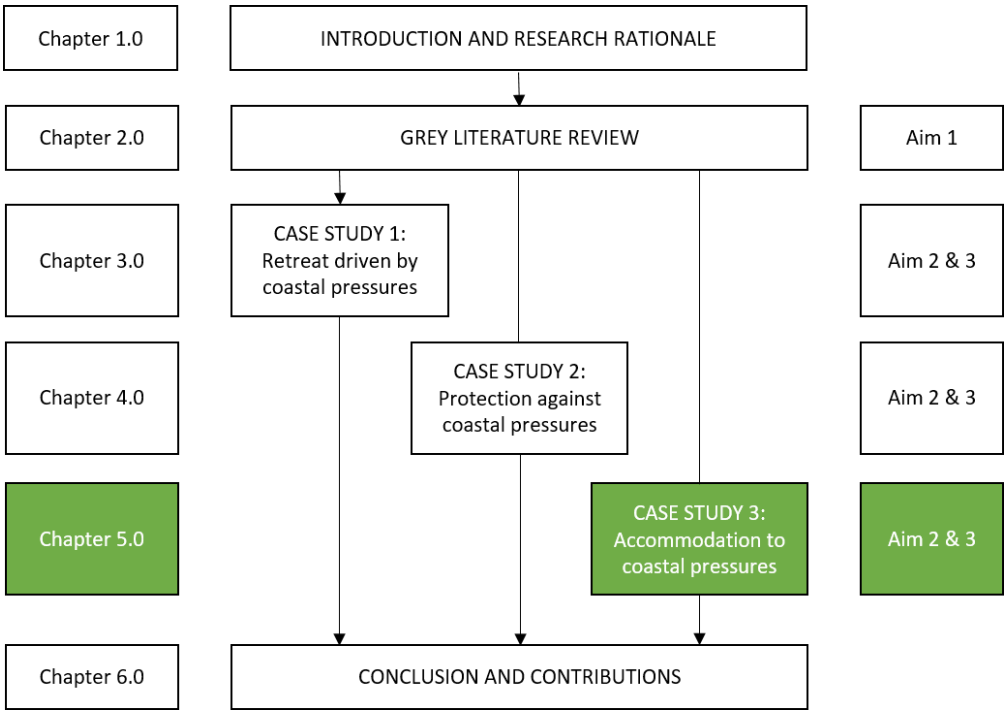


Figure 13: The place of chapter 5.0 in thesis.

Aim 2: Explore the effectiveness of climate change adaptation projects implemented in rural coastal Pacific Island communities in reducing the vulnerability of target communities, across the tripartite of responses: retreat, protect, and accommodate (linked to Chapter 3.0, 4.0, 5.0, and 6.0)

Objective 2a: Evaluate the outcomes of projects from community perspectives in terms of project appropriateness, efficacy, equity, impact, and sustainability;

Objective 2b: Identify dominant barriers to achieving successful adaptation in case study sites.

Objective 2c: Identify if projects have successfully reduced the vulnerability of target communities, and why/why not;

Aim 3: Provide recommendations and insights into both the effectiveness of climate change adaptation in reducing the vulnerability of rural coastal communities (linked to Chapter 6.0)

Objective 3a: Drawing on the case studies, elucidate what factors contributed to the success, or failure, of planned adaptation;

Objective 3b: Explore opportunities through which adaptation can be targeted to improve the outcomes for rural coastal communities in Pacific Islands

This chapter has been written as a manuscript and in currently in review with *Regional Environmental Change*:

– Piggott-McKellar, A.E., McNamara, K.E. and Nunn, P.D. In Review. Who defines 'good' climate change adaptation and why it matters: a case study from Abaiang Island, Kiribati. *Regional Environmental Change*.

Statement of Authorship for this Chapter

The conception and design of this chapter was undertaken primarily by the candidate (80%) and in part by Karen McNamara (20%). The analysis and interpretation was undertaken solely by the candidate (100%). This chapter was written solely by the candidate (100%) with editing done by the candidate (20%), Karen E. McNamara (40%), and Patrick D. Nunn (40%).

Abstract

PICs, despite significant variation in levels of exposure and internal adaptive capacities, are often portrayed homogenously as the world's most vulnerable region to climate change. As such over the past few decades, a plethora of projects intended to assist communities across the region adapt to future climate change have been developed, channelled through multilateral and bilateral funding mechanisms and implemented in communities across a range of countries. Whether such adaptation projects have been effective in reducing the vulnerability of targeted groups remains unclear. This paper evaluates a climate change adaptation project focused on food security implemented across two communities on Abaiang Island, Kiribati (central Pacific). The project was independently evaluated using the following criteria: appropriateness, equity, efficacy, impact, and sustainability. Data was gathered from FGs with recipient community members (n=84) supplemented by interviews (n=26) with relevant local stakeholders involved in implementation. Results show that while the project inputs (such as tangible and intangible goods and services) were provided, the outcomes of the project were largely ineffective and unsustained among the target communities. The main lesson is that local contextual factors – be they social norms, environmental, or local governance and decision-making structures – must be clearly identified, meaningfully acknowledged, and accounted for when designing and implementing local level adaptation initiatives. This then raises broader questions about who is currently, and who should be defining 'good' adaptation. The answer to this question has ramifications for social justice as well as broader issues for developing effective sustainable responses to the challenges of climate change in such places.

5.1 Introduction

PICs are often depicted as homogenous with regards to their vulnerability to climate change. Such assertions can hold some truth as PICs share similar characteristics such as high coastline to land-mass ratios, often sub-optimal physical infrastructure, limited economic opportunities, and colonial legacies, thus adding to levels of vulnerability (Barnett and Campbell 2010; Huq and Reed 2007; Jackson, McNamara and Witt 2017; Kelman 2014). Yet, such assertions often do not account for the high levels of internal resilience within PICs, the people of which have survived and adapted to changes in local environments for millennia (Barnett and McMichael 2018; Bryant-Tokalau 2018; Lefale 2010; McNamara and Prasad 2014; Nunn 2013).

This depiction of the entire Pacific as vulnerable further does not account for the significant diversity of contextual factors that influence vulnerability. Across PICs there are variations in geographies, climatic conditions, cultures and cultural norms, histories, political and governance structures, social capital, and economies that give rise to significant heterogeneity (Barnett and Campbell 2010). For example, the geography and climate of high volcanic island nations like Vanuatu and Fiji present quite different challenges to those on equatorial atoll nations like Kiribati, most islands in which reach only a few meters above mean sea-level. Likewise, historical influences such as colonialism, while pervasive across the region, differ from country to country and influence ongoing local political, social, and cultural dynamics in different ways. There can also be significant intra-national variation. For example, within a single country core-peripheral patterns and underlying cultural norms, can play a significant role in the exposure of different people or groups to particular livelihood stressors (McNamara et al 2018b; Nunn and Kumar 2018; Weir, Dovey and Orcherton 2016).

It has become increasingly common over the past few decades for planned, external adaptation interventions (projects, policies, activities) to be implemented in PICs to assist in dealing with climate change. Within PICs there remains a heavy reliance on external funding for adaptation through bilateral and multilateral organisations. For example, in Kiribati roughly 40% of government revenue comes from international aid (Webber 2013). This dependence results in project design often being determined by understandings and priorities of foreign countries. Yet as a location's exposure and vulnerability (both physical and socio-political) differ greatly, so does the need for site specific targeted adaptation responses that account for such diversity (Adger, Arnell and Tompkins 2005; O'Brien et al 2007; Sovacool, Linnér and Klein 2017). Consequently, the goals of projects implemented through these avenues may not necessarily align with the goals of national and local governments, or target communities themselves (Barnett and Campbell 2010; Dean, Green and Nunn 2016; Piggott-McKellar, McNamara, Nunn and Sekinini 2020). This can result in the failure of projects to produce long term benefits for recipient communities. It has been suggested that externally funded adaptation can increase vulnerability to climate change by creating dependency and subsequently reducing governance capacity (Barnett 2008; Nunn and Kumar 2019a). Further, the performative nature of vulnerability discourse can also perpetuate perceptions of island

vulnerability in pursuit of climate change funding, detracting from other key, and equally pressing, development issues (Webber 2013).

Owing to these challenges and questions around the success of planned adaptations, there is an identified need in the literature for detailed site-specific project evaluations to determine the outcomes of planned adaptations (Clissold and McNamara 2019). This is especially needed from the perspective of those at the frontline of climate impacts and for whom adaptations are implemented to assist, a perspective often lacking in the adaptation literature (Faulkner, Ayers and Huq 2015; Piggott-McKellar et al 2019b; Mallin 2018). As such, this research contributes to this gap through providing an independent external case study analysis and evaluation of a planned adaptation project focused on enhancing food security, implemented in two communities on Abaiang Island, Kiribati in 2014. The case study project was analysed across five criteria: appropriateness, equity, efficacy, impact, and sustainability (justified in more detail below). Stakeholder perspectives, captured in interviews, from those responsible for implementing projects in the region (including local and national government staff, local and international NGOs, and development organisations) help to contextualise the data. The suitability of the project for the localised context is explored to provide insight into whether the project was aligned with local needs and underlying vulnerabilities, and further elucidate project outcomes. This provides the context for a discussion surrounding who is currently, and who should be responsible for designing adaptation goals and objectives, and further determining what is 'good' adaptation. This research is especially pertinent since no known evaluations of planned CBA in Kiribati have been published in the academic literature.

5.2 Community-based planned adaptation in the Pacific region

The overarching aim of planned adaptation is to reduce the vulnerability of a system to climate change impacts (Barnett and Campbell 2010). Despite this, reducing vulnerability is not devoid of challenges. For example, there is no single definition of vulnerability to climate change (Füssel 2007), and how different actors conceptualise, and frame vulnerability also influence the type of adaptation policy or program implemented (Barrowman and Kumar 2018; O'Brien et al 2007). Despite such ambiguities, vulnerability is generally considered and accepted to be a combination of both the forces acting upon a system and the propensity of that system to be harmed (Jackson, McNamara and Witt 2017; Tu'akoi et al 2018). In other words,

vulnerability to climate change includes the impacts associated with climate change (i.e. sea-level rise, increased storm surge activity, tidal inundation), as well as the adaptive capacity (i.e. local knowledge, access to information and assets, social capital) and susceptibility (i.e. institutional, social, historical, economic) of the system upon which impacts are being felt. It has been argued that planned adaptation too often focuses solely on protecting against climate change impacts rather than accounting for the factors that inherently drive and create human vulnerability (O'Brien et al 2007; Nagoda 2015). These underlying causes of vulnerability are vast and include corruption, limited or inadequate infrastructure, limited access to resources, power dynamics, and social structures that can exclude particular groups. For adaptation to be truly meaningful in reducing the vulnerability of all affected, such factors should be accounted for and inbuilt into adaptation responses (Boyd and Juhola 2009; Mimura et al 2014; Ribot 2011).

Planned adaptation takes many forms and is often conceptualised as large-scale infrastructural solutions (Klöck and Nunn 2019) yet there is growing interest in smaller-scale locally implemented adaptation responses (Forsyth 2013), often termed CBA. The concept of CBA was born out of lessons stemming from natural resource management and development projects through an understanding of both the inadequacies of traditional top-down projects (McNamara and Buggy 2016; Nunn 2009) and the benefits of empowering local actors in driving decision-making (Forsyth 2013; Reid 2016). As Barnett (2008: 45) states "adaptation is not something that can be done to a community. It is something that needs to be done by a community, determined by its own needs and values". CBA builds off human rights principles and takes a "no-regrets" approach (Heltberg, Siegel and Jorgensen 2009) in that project goals and concepts should be developed by the community, account for existing underlying vulnerabilities, and utilise knowledge and resources available to the community. CBA also aims to address climate change impacts experienced now and to account for future variability (Ayers and Forsyth, 2009; Forsyth, 2013; Reid, 2016).

While CBA is an important approach within the adaptation field, and it offers many potential positive opportunities as outlined above, many barriers exist that can divert or delay the adaptation process from achieving successful desired adaptation outcomes (Eisenack et al 2014; Moser and Ekstrom 2010). Reviews of CBA barriers globally in both the academic (Spires,

Shackleton and Cundill 2014) and grey literature (Piggott-McKellar et al 2019b) reveal a range of challenges experienced in achieving effective and sustainable outcomes at this level including cognitive and behavioural, knowledge and communication, and financial barriers. While advances in CBA theory have been made within the academic literature, it is questionable whether these are applied in practice (Piggott-McKellar et al 2019b). Further, there are challenges for CBA given that it inherently targets a specific local environmental and socio-political context, which makes learning lessons that can be transferable to other scales a challenge (Pelling, 2011; Reid and Schipper, 2014). This localised approach is also complicated as communities are not isolated from wider pressures such as governance, globaliation, trade, and political conflict (Jamero et al 2018; McCubbin, Smit and Pearce 2015; Moser and Ekstrom 2010). Such outside influences can not only create further pressures and vulnerabilities on communities but also influence adaptation outcomes (Kuruppu 2009). As community level responses are by nature locally specific, contextual factors pertaining to local context and underlying vulnerabilities must be accounted for in the planning process of adaptation to ensure they do not undermine adaptation success (McCubbin, Smit and Pearce 2015). Yet as Klöck and Nunn (2019) note, that while the need for context specific adaptation has been recognised, there remains no evaluation of the suitability of adaptation within a localised context within the academic literature in SIDs more broadly.

Focusing on CBA in the Pacific Region, there have been numerous studies undertaken that explore CBA and identify both challenges in achieving success and opportunities for improvement (Buggy and McNamara 2016; Dumaru 2010; Ensor et al 2018; McNamara 2013; Nunn et al 2016a; Remling and Veitayaki 2016). A range of cultural, social, and economic barriers are identified as the dominant challenges to CBA in the Pacific. For example, through an exploration of both development and CBA projects on Pele Island in Vanuatu, Buggy and McNamara (2016) concluded that local power dynamics, social structures and hierarchies, individual perspectives, and relationships resulted in challenges around elite capture and community conflict, and ultimately the breakdown of projects. Another challenge comes from Pacific Islanders' religious beliefs which often lead them to dismiss secular interventions, sometimes even to deny climate change (Kempf 2017; Nunn et al 2016a). Research conducted in Samoa explores the way people perceive risk in relation to environmental change;

perceptions differed significantly across aspects of gender and access, which can have implications for engagement and input into community-based projects (Ensor et al 2018).

Through an exploration of local stakeholders responsible for implementing projects in the Pacific, key lessons have emerged about how to improve CBA outcomes. These include: enhancing sustainable livelihoods; providing awareness and education in locally culturally appropriate forms; include local knowledge in project design; and ensure community ownership of projects (McNamara 2013). Research in Fiji suggest that opportunities for successful CBA exist through multiple avenues including: ensuring messaging on climate change impacts is appropriately and effectively communicated; creating strong links between communities and technical partners; dealing with underlying vulnerabilities; ensuring CBA facilitation is undertaken by people who understand local protocols, and speak the same language; and recognising that CBA takes time and practice in such contexts beyond that which might be regarded as usual in developed-country contexts (Dumaru 2010). While CBA has the potential for becoming an effective tool in aiding communities adapt to climate change, such projects should also acknowledge local development aspirations, local social dynamics and traditional knowledge, and stakeholder preferences for immediate environmental, economic, and social benefits (Remling and Veitayaki 2016). It has also been identified that for CBA to be truly effective, frameworks that account for existing inequalities should be intentionally and appropriately utilised (Clarke, McNamara, Clissold and Nunn 2019). As discussed, enablers and opportunities for improving CBA centre around holistically engaging communities in the process, and ensuring projects are in line with the local context in which people understand and access information, their livelihoods, and community dynamics.

5.3 Case study site and CBA project background

Kiribati (see Figure 14) is an island nation located in the central Pacific Ocean straddling both the equator and the International Date Line. Kiribati comprises 33 islands, 32 of which are atolls with one raised limestone island, Banaba. These islands are represented by three island groups: Gilbert, Phoenix and Line islands. The population of Kiribati is 110 136, with the capital, South Tarawa (situated in the Gilbert group) home to over half of this, with a population of 56, 388 (Asian Development Bank 2007; World Bank 2018). While the total land size of all islands on Kiribati is only 811km^2, this is spread over an ocean 3.5 million km^2 in size. Kiribati is

classified as a SIDS, as well as a Least Developed Country with donor assistance roughly 41% of total government revenue in 2010 (Webber 2013). Kiribati (otherwise known as Gilbertese) is the dominant language spoken. English, while also an official language is not widely spoken especially outside of the capital South Tarawa.

Abaiang is the closest island to the capital on South Tarawa and is situated one-degree north of the equator. To access Abaiang it takes 4hrs via a local ferry that services the island a few times a week, or two hours via a private speed boat. Flights through Air Kiribati also service the island a few times a week. It is the fourth most populous island in Kiribati with 5 568 inhabitants (with 49% male and 51% female). There are 18 villages on Abaiang, two of which are located on islets and only accessible via boat. The other 16 villages are spread along the 37km stretch of land with a width no greater than 1km, and a total land area of 17km^2. Two villages were chosen as research case study sites on Abaiang: Tabontebike and Tuarabu (see Figure 14). These villages were chosen through consultation with the local agricultural assistant on Abaiang Island. Both villages have been recent recipients of a food security project. Tabontebike is located at the southern end of Abaiang, while Tuarabu is roughly in the middle of the island. The population at the time of research of each village was 255 and 537 respectively.

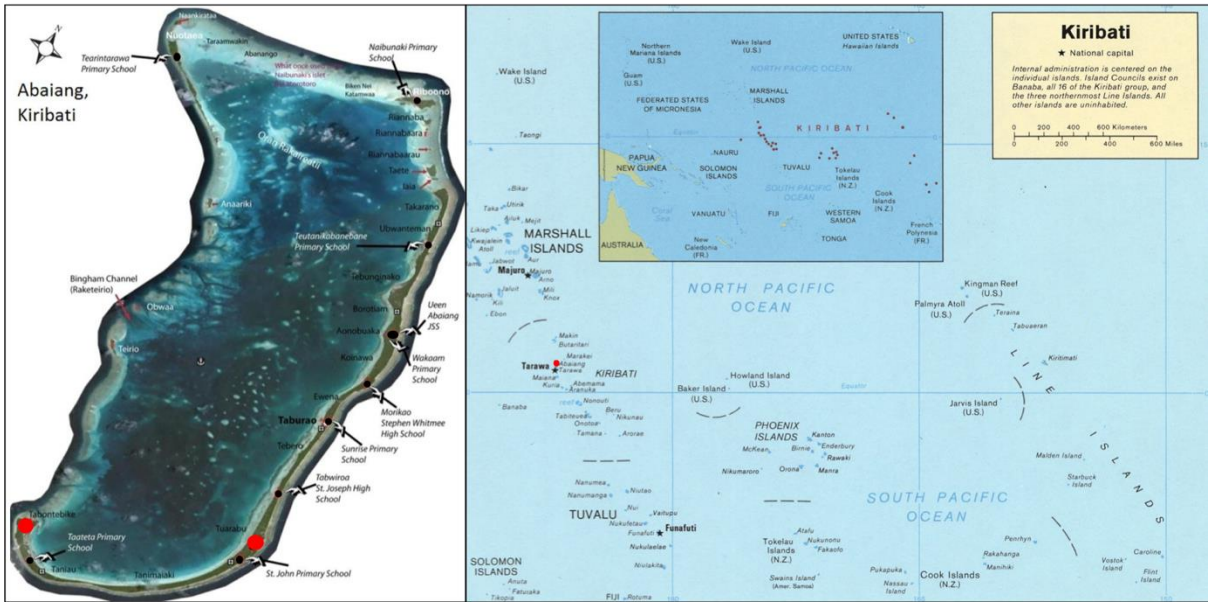


Figure 14: Map of Kiribati showing the location of case study sites - Tuarabu and Tabontebike.

There has been much attention surrounding the vulnerability of Kiribati to climate change, namely sea-level rise. For example, some researchers have argued that Kiribati is at threat of becoming uninhabitable due to sea-level rise (Weir and Virani 2011), while others have argued that the future is much more complex, as atoll islands like those of Kiribati could indeed be growing due to natural atoll dynamics (Donner 2015a; Webb and Kench 2010). Despite such contention, it is widely acknowledged that climate change is, and will continue to add to the already existing pressures that are threatening the livelihoods of I-Kiribati and as such effective and sustainable adaptation is imperative. Abaiang Island has been classified as 'highly vulnerable' to climate change impacts by the Government of Kiribati (Government of Kiribati et al 2016). In both villages, climatic and environmental changes experienced most severely have been coastal erosion, saltwater intrusion, tidal inundation, changing temperatures, and less predictable rainfall events. Alongside these climate threats, there are numerous other development challenges and vulnerabilities experienced within the communities on Abaiang Island.

Opportunities for waged employment are few in both villages with the main source of income being copra (dried coconut kernel). The use of copra dominated at the time of research as the government had introduced a copra subsidy that incentivied its production and processing locally (Pacific Islands Report 2017). Aside from copra, other sources of income include the sale of surplus foods and handicrafts yet this is constrained by limited market access. In addition to the limited economic and employment opportunities are growing expenses for local people including the purchase of imported food, church contributions, and kava (imported) consumption. Imported foods like rice, flour, and sugar, as well as canned fish, biscuits and other packaged goods dominate local diets which has resulted in a decrease of traditional subsistence activities of fishing and cultivation of crops (Thomas 2002). This confluence of factors of both increased expenses and limited economic opportunity has resulted in increasing financial pressures on people in both villages.

The social hierarchy within the villages themselves are represented by the *unimane* (elder males in the village) who are the main decision-making body. The eldest male in the village holds the highest position. This presents challenges for certain members of the community who inherently lack access to decision-making processes. The village also has an elected

councillor who is responsible for organising the village around groups meetings and events, disseminating information, and acts as a liaison between the island council, other villages, and South Tarawa. Religion is an important aspect of life on Kiribati. Of the total population, the dominant religions are Roman Catholic (75%), Kiribati Protestant Church (17%) and the Church of the Latter Day Saints (3.5%) (National Statistics Office 2016).

The food security project implemented in both villages – the case study for this research – was part of a regional project implemented in six countries across the Pacific Region in 2014. This project was funded through a multilateral donor and implemented in Kiribati in cohort with a regional organisation and local government department. The project was originally implemented in three villages in Kiribati, all on Abaiang Island (two of which are the focus of this research). The third village was not part of this research due to organisational and time constraints. The primary aim of the project was to enhance the resilience of local food systems in response to climate change. Namely, key objectives of the project were to 1) maintain and/or improve food security in the face of climate change; 2) increase local and national capacity to build food security and respond to climate change; and 3) integrate successful local approaches into wider climate change strategies. The specific deliverables of the project primarily centred on introducing into communities new (and existing) food varieties and crops (e.g. pumpkin, sweet potato, taro, cassava, native fig, coconut) to be established in a community level nursery, introduce animals including chickens and pigs along with infrastructure to house them, and provide training to village members to maintain the project.

5.4 Methods

5.4.1 Qualitative research design and analysis

Qualitative research was undertaken in case study locations in April 2017. FGs were chosen as the primary method of research as they are a useful tool to uncover a rich understanding of perceptions, thoughts, impressions and feelings of a group of people, provided from their own perspective in their own words (Cameron 2016). Six FGs were conducted with a total 84 participants. Three were undertaken in each village with separate male, female and youth groups. This was done to ensure a wide range of community members from various groups could be heard to garner a range of perspectives. This is especially important in a Pacific Island

context due to the often patriarchal societal model, where women and youth do not hold the same decision-making powers and are often not given opportunities to speak up during village discussions. Dividing FGs by gender and age is a method commonly undertaken when conducting participatory research in the Pacific (Scott-Parker and Kumar 2018). Breaking FGs up this way allowed findings to be compared across these groups. It is important to note that within these groups (male, female, youth), all are not equal and levels of vulnerability and power within a community are dependent on a range of intersecting factors including status, employment and income (Arora-Jonsson 2011).

Each FG ran for approximately two and a half hours, directed by a FG guide. Interviews with the village headman in both villages were also undertaken. A local translator was used throughout the process to translate questions into Kiribati. The FGs were recorded and transcribed with the assistance of the translator, and then re-listened to by a third-party translator to ensure the translations were accurate. Transcriptions of FGs were coded by the questions asked to determine the dominant findings within each evaluation criteria.

In addition to FGs, a series of interviews (n=26) were undertaken with a range of stakeholders in the climate change adaptation field in Kiribati. Interviews were conducted in English. These stakeholders were mainly those responsible for implementing a range of climate change, disaster risk, and natural resource management projects throughout Kiribati. They included national and local government staff from various departments, staff from both local and international non-government organisations working locally in Kiribati, and development partners such as UNDP. Interviews were semi-structured, allowing both structure and versatility in questioning. Each interview ran for approximately one hour but ranged anywhere from 25 minutes to two and half hours. Interviews were recorded with the consent and permission of interviewees, and later transcribed.

The aim of the interviews was to add a layer of understanding and contextualie the responses received from the community and develop a more holistic understanding of the issues faced in achieving successful CBA project implementation. Examples of questions asked included: what are some of the main challenges you experience when working with communities on climate change (or other) projects? who do you think should be responsible for developing

project goals, and why? provide an example of a project you have been involved in that has been successful and give details of why this was the case; and provide an example of a project you have been involved in that was not successful and give details of why this was the case. Data from both FGs and interviews was analysed through a content analysis in which similar questions were coded to elucidate common responses.

Ethical approval followed guidelines from the University of Queensland and involved the use of participant information sheets where the information of the study was written in Kiribati and read to the participants with the recognition that they were able to ask questions about the study and to ensure that the information was being freely given and the process transparent. Consent forms were then signed by a representative of the group.

5.4.2 Project evaluation criteria

Historically within the evaluation of development programs and projects, an input-output approach was used. As the realisation grew that this was an inadequate approach to evaluate holistic project success, the inclusion of outcomes and impacts advanced (Faulkner, Ayers and Huq 2015; Lamhauge, Lanzi and Agrawala 2012; Picciotto 2013). As such, common criteria to evaluate the success of projects used today are: efficacy, efficiency, and relevance which look at shorter term project outcomes, and impact and sustainability which refer to the longer-term impacts (Picciotto 2013). Drawing on and building upon these, five key criteria were chosen to evaluate this climate change adaptation project. These criteria are: appropriateness, efficacy, equity, impact, and sustainability. Of key not, efficiency has not been included due to the evaluation being undertaken from community perspectives leaving this criterion of little relevance. Equity has been included given the issues that can arise from lack of access to, and benefits from projects across community level intersections. Lastly, the criterion relevant was altered to 'appropriate', with these being interchangeable in the literature. The evaluation criteria used in this study have similarly been used by other researchers to evaluate planned community adaptation projects (see Clarke et al 2019; Clissold and McNamara 2019; Piggott-McKellar et al 2020).

The evaluation criteria served as the foundation of the FG guide. The FG guide was distributed to outside stakeholders including practitioners and NGOs working in this field in the Pacific

region for their input. This feedback was taken into consideration and the FG guide amended where appropriate.

5.4.3 Research limitations

There were limitations encountered through the process of this research. The dominant limitation was the process of translating FGs into Kiribati. In addition, conducting interviews in English is seen as another limitation, as while an official language of Kiribati it is not the preferred vernacular for many of the interviewees. Working in PICs, finding words to translate across languages can be difficult, making it challenging to ask questions with subtle differences (Rudiak-Gould 2012). It was further noted when having a third party assist with transcribing, that the translator present during FGs was leading answers to a particular question. To satisfy this discrepancy, this question and subsequent responses were omitted from the data set. The FGs also took a long time due to translation requirements. Furthermore, as Kiribati society is largely hierarchical, during the male FG in particular, it was common that participants would wait until village leaders spoke before others would answer questions. This was ameliorated by guiding and probing other participants when asking questions to garner responses from a wider range of people.

5.5 Community evaluation of the adaptation project

Table 7 details examples of the questions asked and responses which encapsulate dominant thinking from the communities, across each of the criterion. Sustainability and impact have been combined, as the answers and sentiments are closely aligned, and both represent the *outcomes* of the project. Discussion pertaining to the criteria is detailed below. It is important to note that some responses are relevant to multiple criteria and as such there is some cross over in the following discussion.

Table 7: Example of responses given by respondents across the criteria and subsequent questions.

	Example of FG questions	*Example of representative responses from FGs*
Appropriateness	Did the project address your needs, issues and concerns?	"It was really relevant" "I like the idea of gardening because it could also cater for our survival and making money"
	Were the project components relevant?	"Maybe this is relevant for only a few who had a different kind of diet. They eat cabbage and all of that, but most people here it is not relevant" "We would prefer the things we really need for example, banana and coconut. The rest, not interested"
	Was the training provided appropriate and useful?	"They gave proper training on how to do the composting and… on how to prepare the seedlings, and… on how to dig the soil… for the seedlings"
	What was the consultation process?	"There is no meeting… to let [us] know about the coming project. So I am very adamant that this is why the project failed." "We were not encouraged to do it because there was no proper consultation. For me, it was very sudden and not convincing the way they conveyed it to us."
Equity	Did all groups of people, and individuals, have the opportunity to be involved in the project?	"We were told only one person represent the household. So it would be either the men or the women. Or the youth, if the parents allow them to represent the household" "The invitation for everyone, but during that day mostly men came along but only a few women joined"
	Did everyone or only a few people or groups of people benefited from the project	"No one benefits because the crops were dead and the pigs were dead [and] the chickens die"
	Who managed the project and why?	"There were five different sections of the village and they chose one from each… it was both men and women. Two women, three men" (Tuarabu) "All men managed it. They were the old men in the village" (Tabontebike)
	Was the management of the project successful?	"Everyone was enthusiastic about it in the first place… when the committee was set up the rest of the village people lack knowledge about what was going on" "I disagree with setting up a committee… because it doesn't work"
Effectiveness	What aspects of the project worked well, and why?	"We [built] the pig pen, with the foundation and the roof" "There was a demonstration on how to do [the compost]… they did it really well"
	What aspects of the project did not work well, and why?	"We don't get paid" "We were told that [the vegetables and crops] grow [in the nursery] and after time we could move them to where we want them but that failed. Only the young coconuts grow well" "The biggest failure is the provision of the water. They said they would provide water that would spray the plants but they didn't, so most of the crops die…"
	What did the community gain from the project?	"We gained nothing" "From the training we learnt how to make food for the tree and grow plants… we know the ingredients for composting"
	Did the project enhanced the community's ability to deal with climate change?	"Food security is really important, but even with that it can't stop the water coming up"
Impact and sustainability	Was adequate support and communication available during and after the implementation of projects?	"When the funding ceased, they stopped coming back" "The most important thing in the project is for the implementers to have consistent monitoring so that they will be able to know what issues the villages have"
	Did you want short- or long-term project goals?	"We wanted it for long term goals, for the next generations"
	Are project activities still being implemented? why is this the case.?	"Majority that did it are not continuing it" "The gardening is not our traditional way of living, so we tend to spend more time with the things that we used to do, like fishing and going out to the forest to harvest coconut for the copra."

5.5.1 Average levels of appropriateness

The appropriateness of the project explores its 'overall relevance of the project and associated suitability of the intervention in terms of community priorities and their cultural and social ethos.' In terms of the relevance of food security to the community, people stated that while they have adequate food to eat, the focus of the project on food security was expressed as important to them. Yet the specific food types involved in the project were not seen to be appropriate. The project introduced vegetables, such as cabbage, not commonly eaten or grown in the villages. People stated they had a strong preference for more familiar and relevant foods: "*we would prefer the things we really need for example, banana and coconut. The rest, not interested*" (Tabontebike Men FG). It was further stated that some of the vegetables that were introduced with the project did not actually grow: "*We were told that [the vegetables and crops] grow [in the nursery] and after time we could move them to where we want them but that failed. Only the young coconuts grow well*" (Tabontebike Men FG).

The consultation process was further explored under this criterion. In both villages, participants stated that the implementing team arrived to inform the community about the project. In this way the community members had no input into the project design. This is aptly expressed through the following: "*There is no meeting… to let [us] know about the coming project. So I am very adamant that this is why the project failed*" (Tuarabu Men FG). This lack of appropriate and meaningful participatory community involvement, as seen in this case, has been identified as one of the challenges for community level adaptation (as well as any development, disaster risk, or natural resource project), as the term and processes of participation can be used as tokenistic rather than meaningful engagement (Dodman and Mitlin 2013; Reid and Schipper, 2014). Through not having involvement in the direction of project goals and objectives, the relevance of these has been called into question. Through interviews this was expressed as particularly pertinent because governments like that of Kiribati rely on external assistance that leaves project goals driven not by the communities but by donors or governments who may have to adhere to specific requirements.

5.5.2 Poor levels of equity

The equity of the project referred to the 'inclusion and benefit of project interventions for everyone within the community, specifically with regards to any potentially marginalied

groups.' An important distinction to make here is the difference between equity and equality. The processes of consultation and community involvement in this case can be seen as equal, in the sense that there was an invitation for 'everyone' to participate in the training component of the project. Yet it was not equitable in that it did not provide the mechanisms that would readily allow all people within the community to engage in the project. As Cleaver (2009: 135) states, there is a false assumption "that if the spaces for decision-making are local, and the rules for access and distribution fair, then all parties will potentially be able to participate and benefit". Frustration with the inability to be involved in decision-making was expressed, as represented through the following quote: "*There should be involvement of the youth, the women, and then men so there is a balance in decision-making*" (Tabontebike Youth FG).

The management of the project was explored in the equity criterion. This was done due to the challenges associated with access to decision-making and management roles, for some groups within the community, due to underlying social and cultural norms (Buggy and McNamara 2016). Challenges faced with the management of the project were expressed in both villages: "*Everyone was enthusiastic about it in the first place… when the committee was set up the rest of the village people lack knowledge about what was going on*" (Tabontebike Youth), and "*I disagree with setting up a committee… because it doesn't work*" (Tuarabu Women). In Tabontebike the management of the project served to represent issues of elite capture, with the committee made up of the *unimane,* who comprise the eldest men in the village, leaving other village members unable to be involved. These challenges have been similarly identified in adaptation projects in Vanuatu (Buggy and McNamara 2016) and elsewhere in the Pacific Islands (Nunn et al 2014). In Tuarabu there was representation by both men and women (3 men and 2 women) with a village vote being undertaken to decide on the management committee with one representative from the five sections of the village.

5.5.3 Adequate project efficacy

In terms of the efficacy of the project, the extent to which the objectives of the project were achieved in terms of inputs, we see that the project did achieve its objectives to a large extent. It is important to note this refers to the provision of project inputs (such as the establishment of nurseries, seeds, infrastructural materials, livestock), not the actual *outcomes* of the project. The provision of tangible materials such as pigs, chickens, and infrastructure, as planned, were

all provided to the community. Skills training related to composting and how to plant seedlings was also included and executed as part of the project. A dominant finding in terms of intangible benefits from the project was that from the training component people were able to develop new skills on composting: "*from the training we learnt how to make food for the tree and grow plants… we know the ingredients for composting*" (Tuarabu Men FG).

Within this criterion, discussions around what participants would have liked included in the project revealed a desire for monetary compensation. This was something expressed from interviews with stakeholders responsible for implementing projects as well: "*for example when there is a project… the villagers will only come if there is a presence of money. I think that maybe because some of the project pay people, maybe everyone in the village assumes every project should pay" (Interview #13).* Further, there were things that the community stated they were promised as part of the project but which did not come to fruition. This included the provision of water irrigation for the crops: "*the biggest failure is the provision of the water. They said they would provide water… but they didn't, so most of the crops dies because of water… everything that should be provided wasn't there*" (Tuarabu Men FG). It is important to note that discussions with the project implementers as part of this research revealed that while a lack of water provision was seen to be a reason for project failure, this was not a part of the original project design. Whether this was promised to the community or not is beyond the scope and purpose of this research, yet this example represents a level of miscommunication and mistrust between villages and outside stakeholders, found to be a pervasive barrier in other CBA initiatives (Spires, Shackleton and Cundill 2014).

5.5.4 Limited impact and sustainability

Here the project was explored in terms of the impact (the net outcomes of the project) and sustainability (whether the project is still being implemented), both referring to an outcome focused evaluative perspective. The project is no longer being implemented in either village with the exception of a few households that are independently growing some crops introduced with the project in their own gardens: "*Some are still continuing with the project and some stopped… the majority that did it are not continuing it"* (Tabontebike Youth FG). The remaining aspects of the project (pigs, most crops, chicken) failed, "*the crops were dead and the pigs were dead [and] the chickens die*" (Tuarabu Men FG). The lack of sustainable outcomes of projects

is unfortunately a common theme amongst projects implemented in the Pacific (Nunn 2009; Nunn and Kumar 2018; Nunn and Kumar 2019b). Overall there has been no positive impact for the community: *"We would have been better if the project was successful, but it wasn't"* (Tabontebike Women FG).

When exploring the nature of contact with the implementers, both during and after the project, contact was described by communities as a major issue in that people felt the support and long term monitoring provided by the implementing body was insufficient; "*The most important thing in the project is for the implementers to have consistent monitoring so that they will be able to know what issues the villages have… So the blame will be on those that implement the project… they should always have consistent monitoring*" (Tuarabu Men FG). The absence of long-term monitoring and evaluation of projects has been extensively documented as an issue with current adaptation projects (Piggott-McKellar, McNamara, Nunn and Sekinini 2019a: Piggott-McKellar et al 2020). Further, through these discussions it became evident that there was a disconnect over ownership of the project with different resident groups in both case study sites referring to the project as 'their project' or 'the governments project'.

5.6 Discussion

An evaluation of the CBA project from the perspective of the two recipient communities shows that the project was ineffective; it did not prove particularly effective across any of the assessed criteria other than 'efficacy'. When evaluating overall project effectiveness, this research emphasises the importance of looking beyond criteria that aims to reveal only what was provided in terms of either tangible or intangible goods or services. Rather, project evaluations must look to what the *outcomes* of projects actually are as it provides a more holistic insight and understanding of project effectiveness. The extent to which project evaluations should look beyond inputs becomes clear, with examples in the literature of donors ostensibly proclaiming project 'success', as intended inputs were provided (i.e building of infrastructure, delivery of water tanks and so on), despite the longer-term outcomes of such being negligible, and even potentially maladaptive (Allen 2015; Dean, Green and Nunn 2016; Piggott-McKellar et al 2020).

While the results from this research show the project was not effective in providing sustained outcomes to either community, the question arises as to *why*? There are many factors that can be seen to have contributed to this which have been detailed in the literature including lack of appropriate consultation with communities (Dodman and Mitlin 2013), internal community conflict regarding project management (Buggy and McNamara 2016), and miscommunication and mixed expectations between implementers and the community (Spires, Shackleton and Cundill 2014). While these factors are important to understand, looking more broadly into why the project failed to provide sustained benefits to the community it can be seen the project objectives and processes were derived from outside of the target community and were not driven by local values, experiences, and perspectives, as such failing to account for the local context. As one interviewee stated: "[for a project to be successful] *you have to come here, stay with them, observe them, sleep with them, eat with them, play with them, and then you see their needs because you see their daily life… at that time you can design what project is suitable for them*" (Interview #15). This provides insights into wider considerations when implementing community level adaptation across PICs and other developing countries, exemplifying how local context and values are imperative to acknowledge if effective and sustainable outcomes are to be achieved. This raises the broader questions of who currently is, and who should be responsible for designing and identifying 'good' planned adaptation.

5.6.1 The need to account for the local context and underlying vulnerabilities

Like many planned adaptations channelled to the Pacific region, the subject of the two case studies was designed by a donor organisation and implemented in partnership with regional organisations in multiple communities, with the assistance of local governments, across six PICs. On Abaiang Island, the three recipient communities (two of which were the focus for this research) were chosen originally based on their location on the island: "*the selection of the village is not really done properly I can say… they were asking us to select the villages from the far end and from the middle*" (interview #16). This represents a framework of funding and implementation for adaptation whereby project components are derived and driven by outside stakeholders' perspectives and worldviews without accounting for the local systems and structures that drive vulnerability (Barnett and Campbell 2010; Dean, Green and Nunn 2016; Inderberg, Eriksen, O'Brien and Sygna 2015). This funding and implementation framework, which mirrors a traditional top-down development approach, has been shown

consistently to be ineffective in achieving positive outcomes for communities as it does not allow for understanding the context in which climate change impacts occurs (including social structures, economies, culture, and geography) which are inextricably linked to how climate change will be experienced (O'Brien et al 2007; McCubbin, Smit and Pearce 2015). As such, community level planned adaptation must acknowledge and integrate factors of local context if it is to be truly meaningful in reducing the vulnerability of affected people.

Looking to this case study, we can draw out examples of how the local context was not effectively or appropriately accounted for. For example, all members of the community were not given equitable access to participate (as described in section 4.2). This challenge of inequity in access to both information and decision-making is pervasive, being documented in 32% of projects in a review of CBA grey literature implemented in the Global South (Piggott-McKellar et al 2019b) and noted specifically in Pacific-based studies (Buggy and McNamara 2016; Clarke et al 2019). The decision-making structures in both villages in this research are representative of wider Kiribati and many other PICs, through largely hereditary gender-exclusive and hierarchical decision-making processes. This social and cultural aspect results in an inherent challenge of integrating different groups, and people into the adaptation project and was experienced in both villages. For example, in regards to the training, while the invitation was for everyone to participate, it was mainly the men who went as women were busy with other household and community responsibilities: "*The invitation for everyone, but during that day mostly men came along but only a few women joined*" (Tuarabu Women FG).

When working with communities, there often exists a false assumption that by providing equal and fair access and distribution, then all parties will be able to participate, yet underlying levels of intersectional vulnerability (across class, gender, religion, race) can either increase or decrease a person's access and participation (Dodman and Mitlin 2013; Cleaver 2009). This was experienced in this instance for while the project did not actively exclude anyone, these underlying norms prevented equitable access, namely for women and youth. This challenge has also been noted by implementing partners working with other communities in Kiribati: "*the first thing I noticed here in Kiribati… the consultation is only done with the old men, the unimane, so you just have about five or six of them waiting in the Maneaba* (traditional meeting

house) *for the team to arrive. And they tell us that the women are not part of the consultation*" (Interview #6).

Another aspect that evolved to showcase how the local context was not accounted for, which ultimately impacted the success of the project, is looking at the current economic constraints experienced in both villages, and the evolution of the local food system and diet. In both Tabontebike and Tuarabu, foods are currently dominated by imported food, thus resulting in higher cash expenses for both communities, something experienced across other PICs (McCubbin, Smit and Pearce 2015). This coupled with low wage employment and limited opportunity on Abaiang Island has resulted in a dominant concern and priority centred on income generation. This was clear during FGs with sentiments that people did not get paid being expressed by participants as a problem experienced with the project. An expressed frustration toward a lack of market access was something that inhibited ongoing participation in the project for some community members as people had an expectation of selling foods grown as a result of the project: *"we were discouraged to plant more because there is no one to buy more"* (Tuarabu Men FG). The desire for immediate livelihood needs in terms of income generation coupled with an ongoing move away from subsistence crops to imported foods in both villages impacted the motivations of community members to participate as the project goals were not designed in recognition of, or to account for these.

Just as climate change impacts themselves are experienced in the context of other multiple stressors, adaptation initiatives must also account for and plan according to these (O'Brien et al 2007; McCubbin, Smit and Pearce 2015). Identifying and acknowledging these at the onset and including local community members in the process might have presented avenues through which to account for and integrate targeted objectives specifically relevant to the community, which can help in achieving more successful solutions (Jamero et al 2018). For example, in reference to the equitable distribution of opportunity and access when working with communities, a targeted equity framing that first acknowledges and then accounts for the specific nature of broader power dynamics that operate within communities is essential (Dodman and Mitlin 2013). Many NGOs and development organisations (such as CARE, OXFAM, and UNDP) working in PICs have started incorporating such an approach to transform the role of women and other vulnerable groups and people. For example, a recent study

undertaken by Clarke et al (2019) shows how, in a Vanuatu context, the use of a targeted equity framing by CARE emerged as a key element to project success as it served to combat those existing inequities in the community through an intentional approach to integrate social inclusion into all project phases. This improved the self-efficacy of women in the community and helped to alter perceptions of the value and role women hold in terms of adaptation (Clarke et al 2019). While important to combat underlying inequities, such approaches should further account for local knowledge systems and the multiple avenues through which empowerment can be achieved, and be culturally grounded, accounting for traditional roles and values (McLeod et al 2018). In reference to the degree to which financial constraints and limited market access impacted this project, if acknowledged and understood at the onset of the project design could have presented an opportunity to understand these factors and integrate solutions relevant to the target communities.

5.6.2 Who should define 'good' adaptation

PICs are some of the most vulnerable to climate change in the world (Nurse et al 2014), with impacts far reaching, and threatening basic livelihood assets including food, water, and land security (McCubbin, Smit, and Pearce 2015). As such, targeting adaptation in an effort to assist local communities at the forefront of climate impacts is both agreeable and necessary. This is especially pertinent in a Pacific Island context, as despite being some of the lowest emitting countries, they are amongst those most affected by climate change (Althor, Watson and Fuller 2016). This inequity in the distribution of contribution and affect regarding climate change has given rise to international discussions of climate justice, responsibility, and loss and damage. Of note is the Paris agreement, the most significant international climate agreement to date, where onus has been placed on developed nations to assist those in the Global South (including PICs) in efforts to mobilie climate finance and assist in adaptation efforts (United Nations 2015).

There is significant and unquestioned importance of the role climate change adaptation can and should play to address challenges in Kiribati and other PICs. This is especially considering the impacts of climate change present challenges that can push socio-environments beyond what has been previously experienced. Yet, without consideration and value placed on the experiences, perspectives and values of those who are at the centre of such change,

meaningful community level adaptation appears unlikely. Rather than focusing solely on what objective challenges exist regarding climate change, more fundamental questions must be asked as a starting point to develop planned adaptation at the community level such as: what do communities' themselves value in terms of adaptation? And how can local experiences, aspirations, and perceptions help shape the design and direction of planned adaptations? Looking at the problem from this perspective involves the need to account for how vulnerability to climate change is experienced in place, and across different sectors of society, as what people value and experience can determine what adaptation pathways people perceive as most valuable and important to them. Such an approach can further help gain an understanding of the worldviews, values and beliefs of those that an adaptation is set to help, as a starting point for developing adaptation (Ensor et al 2018; O'Brien, Eriksen, Inderberg and Sygna 2015).

Owing to the often-unsuccessful outcomes of adaptation, integral questions have been raised regarding the position donors, governments, and practitioners hold and who is defining what 'good' adaptation is. As seen in this case study, what was objectively seen as good adaptation through improving food security, while not necessarily being misguided or inaccurate, does not allow for a nuanced understanding of the complex systems at play at the local scale where adaptation is implemented, and the importance placed on such by local people. For example, while food security is an overarching concern for communities on Abaiang Island, more immediate livelihood needs such as income and employment opportunities, were overlooked. This is exacerbated, as the community was not given an option to design or influence the project direction in any way, but rather were used as a means to achieve the overall defined project goals for this regional project. This diminishes the experiences and perspectives of local people and does not recognise or utilise individual or community agency, local and traditional knowledge, or internal adaptive capacities.

While adaptation to climate change is imperative in the current changing world, as the impacts from climate change are already being felt and will continue to accelerate into the future, a more critical perspective must be placed on how planned adaptation is being designed and implemented. This is especially important and relevant, as studies continue to show the downfalls of donor driven objectives in adaptation in PICs (Dean, Green and Nunn 2016;

Piggott-McKellar et al 2020), and the continued dismissal of local people in the process of developing adaptation directions (Few, Brown and Tompkins 2007). Examples detailing the benefits of projects driven by communities with added support to funding and resources by external parties as opposed to being implemented or instructed upon them (Jamero et al 2018; Murtinho, Eakin, López-Carr, and Hayes 2013) could help shed some light on future pathways for adaptation in PICs.

5.7 Conclusion and future directions

Adaptation is an essential strategy for dealing with the increasing impacts from climate change, especially considering mitigation measures are not sufficient to maintain a safe level for future climatic change. Due to the current reliance on external funding for development and adaptation by many PICs, the pervading discourse of vulnerability in the region, and the onus on developed countries to assist those most vulnerable in adaptation efforts, it appears likely that donor funded and driven adaptation will remain an ongoing and important component in the adaptation sphere for PICs. As such, the importance of ensuring that adaptation projects and programmes implemented through such avenues are providing effective and sustainable solutions for targeted groups is clear.

To better understand the impact of community level adaptation requires more project evaluations, especially from those whom projects are implemented to assist. This research showed that in the case of a food security project on Abaiang Island in Kiribati, the project was largely unsuccessful, with limited outcomes of the project sustained. Reasons for this were that the underlying vulnerability context, preferences, expectations, and desires within the community were not accounted for in project goals and objectives, meaning that the communities did not feel sufficient 'ownership' of the intervention to support and sustain it. This framework of external funding from developed countries where project goals are generated without in-depth participation with the local community is questioned, with a call for greater exploration of new frameworks to implement planned adaptation in PICs in a bid to rethink who is defining 'good' adaptation goals and subsequent outcomes. As such, further research into the success of alternative frameworks for community level adaptation would be a useful ongoing contribution to the literature. Further, research detailing what adaptation might look like from local community perspectives in PICs and how these views might differ

across space and time would help strengthen an understanding of what 'good' adaptation can look like. Additionally, there is the overarching issue of who has the right to intervene and to decide the nature of intervention. For example, are communities justified in refusing adaptive interventions because they reject their scientific bases? And should donors who underwrite the costs of such interventions have the right to refuse to fund short-term solutions that address the temporary symptoms of larger problems that clearly require transformative solutions? It seems likely to us that these kinds of questions will be asked increasingly over the next few decades as the visibility and profundity of climate-change challenges in places like Kiribati increase.

6.0 Conclusion and Contributions

Place of Chapter in Thesis

The purpose of this chapter is to summarise the main findings and contributions of this thesis. As such, key outcomes pertaining to each research aim will be summarised in this chapter. Further, discussion surrounding the limitations and challenges that arose while undertaking this research are presented. The main contributions of this thesis to the wider literature and practice are explored as well as possibilities for future research. Figure 15 below shows the place of this chapter in the wider thesis.

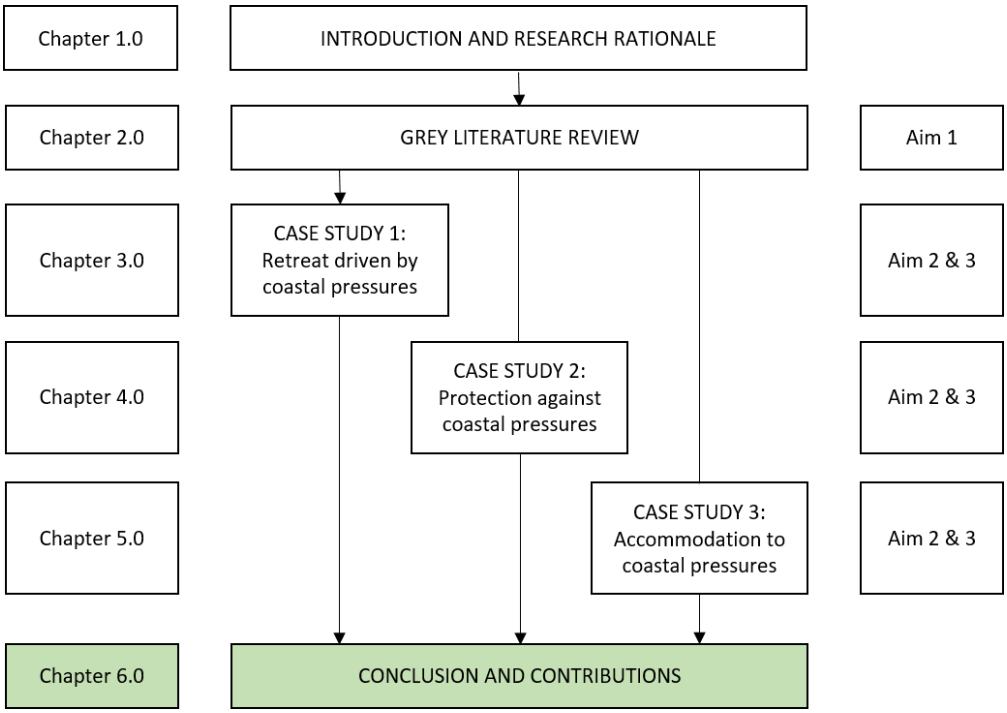


Figure 15: The place of Chapter 6.0 in thesis.

6.1 Main Findings

The main findings of this thesis are presented below. To achieve this, key outcomes specific to each of the three research aims that drove this research are summarised and shown how they build upon the literature.

Research Aim 1: *Identify the barriers for effective community-based climate change adaptation interventions globally, based on a review of grey literature from implementing bodies.*

Research aim 1 was targeted at understanding the barriers to achieving effective adaptation through exploring the wealth of information available in the grey literature (Chapter 2.0, published in *Local Environment*). While academic literature exists pertaining to the barriers experienced when implementing CBA, there was a dearth of analysis drawing on grey literature (Spires, Shackleton and Cundill 2014; McNamara and Buggy 2016). Grey literature is important to focus on as it holds a mass of lessons that exist from on-the-ground practical initiatives that have been implemented, consisting of reports and evaluations from NGOs, INGOs, donors, multilateral and bilateral organisations. As such, research aim 1 was targeted at addressing this gap through preforming a review of barriers as defined in the grey literature. A thematic content analysis was undertaken to identify common themes and barriers from the perspective of those implementing projects, with the implications of these discussed.

Key Outcome 1.a: There was significant difficulty finding projects online that had sufficiently evaluated, reported and shared the outcomes of CBA projects. As such, there is an urgent need for greater sharing of project outcomes and reports to enhance learning from these resources, as well as improve donor value for money.

Key Outcome 1.b: Barriers can be distinguished into three categories: socio-political, resource, and physical systems and processes. This finding closely mirrors that of Spires, Shackleton and Cundill (2014) who undertook a similar review of academic literature.

Key Outcome 1.b: Cognitive and behavioral were the most prevalent barriers identified. This includes factors such as a lack of interest from the community, as well as the projects not being

aligned with community, cultural or social needs. This finding is of keen interest as the core CBA principles include that the process must start with communities' defined needs and perceptions. This gives further rise to questions surrounding the critical and innovative edge of CBA as explored in the academic literature (Dodman and Mitlin 2013; Wright et al 2014), and whether this is being lost in the practice of actually "doing" adaptation on-the-ground.

Research Aim 2: *Explore the effectiveness of climate change adaptation projects implemented in rural coastal Pacific Island communities in reducing the vulnerability of target communities, across the tripartite of responses: retreat, protect, and accommodate.*

Research aim 2 was targeted at providing rich detailed case study material assessing climate change adaptation projects implemented in rural Pacific Island communities (published in the journal *Social Sciences* (Chapter 3.0), in press as a book chapter in *Managing Climate Change Adaptation in the Pacific Region* (Chapter 4.0), and in review with the *journal Regional Environmental Change* (Chapter 5.0)). Exploring and analysing the effectiveness of adaptation projects implemented in communities is imperative to understanding the impact adaptation is having for those most vulnerable. This is especially important to understand from the perspective of those whose projects have been targeted to assist *(Piggott-McKellar et al 2019b – Chapter 2.0).* Despite the increase in community adaptation initiatives implemented throughout the Pacific, a dearth of analysis of their efficacy exists in the academic literature (Remling and Veitayaki 2016). As such, research aim 2 is targeted at addressing this gap in the literature, through providing detailed case studies of climate change adaptation projects, across the tripartite of responses (retreat, protect, and accommodate) implemented in rural Pacific Island coastal communities. Qualitative case studies incorporating FGs and interviews, along with content analysis were used to achieve this aim.

Key Outcome 2.a: Despite all case study projects being implemented in the five years prior to field work, all but one had ceased or were determined not to have long term viability by communities. This is concerning, especially if these projects are to give insight into the broader outcomes of projects across the region. These findings therefore bolster critiques and questions raised about the sustainability of projects implemented in PICs in regard to whether

climate change adaptation funding is having positive and useful impacts for climate-affected communities and people (Adger, Arnell, and Tompkins 2005; Nunn and Kumar 2019a).

Key Outcome 2.b: Building on findings from previous studies (Buggy and McNamara 2016), communities are being viewed as homogenous entities during the process of project implementation. As a result, there has been inequitable distribution in terms of access to decision making and involvement from the range of diverse interests and knowledge sources within the community.

Key Outcome 2.c: The goals of case study projects have largely been focused on targeting biophysical impacts associated with climate change, and not accounting for the contextual factors that generate and drive vulnerability such as access to resources and services, local scale intersectional inequalities, and income and employment opportunities and constraints.

Key Outcome 2.d: Despite all projects being implemented at the community level, communities have experienced limited to nil input into project goals and directions, representing a framework for implementation which mirrors that of a top-down approach. This finding bolster concerns and assertions made within the literature that community is being used as tokenistic rather than meaningful (Leventon et al 2014; Simane and Zaitchik 2014).

Key Outcome 2.e: Maladaptive outcomes have been occurring from adaptation projects, in that instead of reducing vulnerability, projects have, on occasion, inadvertently increased the vulnerability of target populations. This finding contributes to growing concern of the maladaptive potential of adaptation (Work et al 2018).

Research Aim 3: *Provide recommendations and insights into both the effectiveness of climate change adaptation in reducing the vulnerability of rural coastal communities.*

The third research aim is targeted at providing recommendations for improving community level adaptation, drawing on outcomes from the case study material. As such, research aim 3 is a natural follow on from research aim 2. It is especially important and relevant given the limited case study material that exists in the academic literature (Remling and Veitayaki 2016;

Clarke et al 2019; Clissold and McNamara 2019), as well as findings from research aim 1 (Chapter 2.0) which identified that limited sharing of lessons from projects occurs. This research aim, similar to that of research aim 2, was fulfilled in Chapters 3.0, 4.0, 5.0, and published in *Social Sciences* (Chapter 3.0), in press as a book chapter in *Managing Climate Change Adaptation in the Pacific Region (Chapter 4.0)* and in review with the journal *Regional Environmental Change (Chapter 5.0).* This research aim provides important information to improve understanding of how effective and sustainable outcomes can be achieved for communities most affected by climate change.

Key Outcome 3.a: The intersections that exist within a community must be accounted for. To achieve this a targeted equity framing that first acknowledges and then accounts for the specific nature of broader power dynamics that operate within communities is essential to help ameliorate this (Clarke et al 2019).

Key Outcome 3.b: Climate change adaptation implemented in the Pacific region should look beyond bio-physical impacts from climate change and target aspects that can help improve community adaptive capacity. As such, projects must consider the wider factors that generate and drive vulnerability (O'Brien et al 2007).

Key Outcome 3.c: The maladaptive potential of adaption projects must be considered by implementers, with detailed monitoring and evaluation mechanisms to ensure such outcomes do not occur (Piggott-McKellar et al 2020).

Key Outcome 3.d: A shift is required pertaining to the processes and decision-making that permeate the current adaptation model which prioritises short-term adaptations that are driven by the perspectives, objectives, and criteria of donors and implementing agencies. Rather than focusing solely on objective challenges regarding climate change (such as sea-level rise, tidal inundation, coastal erosion) more fundamental questions must be asked as a starting point to develop planned adaptation at the community level such as: what do communities' themselves value in terms of adaptation? And how can local experiences, aspirations, and perceptions help shape the design and direction of planned adaptations?

6.2 Research limitations and challenges

The specific limitations of this research have been discussed in each of the preceding results chapters (2.0, 3.0, 4.0, 5.0). However, given the significance of acknowledging and identifying limitations, they will be additionally summarised more broadly to clearly define the challenges that arose during this thesis and the implications of this on the research outcomes. Discussion of these can give further insight for any similar future research.

This thesis drew on case studies of adaptation projects in PICs to deepen understandings of the effectiveness and sustainability of projects implemented in the region more broadly. As such, the results of this research are dependent upon the specific contexts of both the communities and their wider socio-economic and political environment, the bio-physical hazards experienced, and the nature of the projects that were analysed. As a result, the applicability of the results emerging from this thesis to community level adaptation more broadly should not be viewed as definitive. This is especially so considering the significant variation in local context including social, political, cultural, environmental factors, across and within PICs. As such the results from this research must be viewed with this limitation in mind, that while the results shed important light on community climate change adaptation in rural Pacific Island communities, the applicability is limited.

Working in remote and rural communities in a Pacific Island context can be challenging from a practical standpoint. As such challenges arose with logistics and organisation which had implications for this research. For example, while a significant number of participants were involved in this research (n=205), there were occasions when fieldwork did not go according to plan. For example, in the case study on Korotasere in Vanua Levu Island, Fiji, only one day was spent in the village. This was owing to unanticipated funeral proceedings planned for the following day, coupled with the time constraints of the research team meant a new time to visit could not be made. As such, only eight participants from this village were included in this research.

Another limitation was the challenge of working in a cross-cultural environment where the researcher spoke a different language to that of the participants. As such translation was a key

consideration. Some challenges that arose throughout the research pertaining to this was that FGs took a very long time as they had to be translated as they went. This meant that in some instance's questions had to be left out or adapted in situ. Further, there is the broader challenge of translating words from one language to another, as some words cannot be easily translated across languages (Rudiak-Gould 2012). This was addressed by the researcher through having significant preparation time with local research assistants to ensure questions were understood and could be translated as best as possible.

As this research was primarily qualitative case studies, bias must be further considered. For example, there is an assumption that information presented by participants will be true and honest to their individual experiences. Yet, there is potential bias, such as positive response bias or social desirability bias, when implementing such experiential qualitive methods (Bryman 2008). This is especially relevant in the retreat case study in Vunidogoloa village considering the large number of media and researchers who have visited the village in recent years given it has been flagged as the first climate driven relocation in Fiji.

6.3 Contributions to the literature

Through both literature reviews (Chapter 2.0) and in-depth case studies assessing the effectiveness of CBA in rural communities in PICs (Chapters 3.0, 4.0, 5.0) this thesis provides five key contributions to the literature. These are detailed below.

Contribution 1: This thesis developed and implemented an in-depth set of criteria which can be used to analyse projects (including CBA) to more adequately captivate the experiences and perspectives of local people, and more holistically evaluate project success. These criteria looked across project appropriateness, equity, efficacy, impact and sustainability. These have since been used to evaluate a range of projects (see Clarke et al 2019; Clissold and McNamara 2019).

Contribution 2: This thesis has provided rich empirical case study material which has enhanced understanding surrounding the outcomes of community level adaptation in a Pacific Island context. This is especially important and a valuable contribution to the literature given that adaptation projects are likely to increase going forward into the future and there exists limited

detail analysis of projects published in the academic literature. As such chapters 3.0, 4.0, and 5.0 provided a significant contribution.

Contribution 3: This thesis has shed important light on the inadequacies of externally driven planned adaptation. It has been shown and discussed that without consideration of community needs, values, and perspectives then adaptation implemented at the community level is unlikely to provide significant outcomes to communities.

Contribution 4: This thesis has contributed to the knowledge that while the premise of adaptation is to reduce the vulnerability of target communities (Barnett and Campbell 2010), adaptation in a Pacific Island context is not viewing vulnerability holistically. Rather adaptation is focused predominantly on reducing impacts from bio-physical hazards associated with climate change and not the underlying contextual factors that generate and drive vulnerability.

Contribution 5: This thesis has contributed empirical evidence to show that adaptation in a Pacific Island context is, in some cases maladaptive. This is contributing significantly to the literature as while the potential for maladaptation has been increasingly discussed (Barnett and O'Neill 2010; Juhola et al 2016; Work et al 2018) there is a dearth of empirical evidence showcasing the maladaptive outcomes on communities (Piggott-McKellar 2020).

6.4 Future Research Directions

PICs are some of the most vulnerable to climate change in the world (Nurse et al 2014), with impacts far reaching, and threatening basic livelihood assets including food, water, and land security (McCubbin, Smit, and Pearce 2015). As such, targeting adaptation in an effort to assist local communities at the forefront of climate impacts is both agreeable and necessary. As such, climate change adaptation will remain an important tool to assist those most vulnerable, including those in PICs. As such, to better understand the impact of community level adaptation requires more project evaluations, such as those presented in this thesis, to continue a further understanding of what does, and what does not lead to successful adaptation.

While the important role planned climate change adaptation can play remains accepted, without consideration and value placed on the experiences, perspectives and values of those who are at the centre of such change, meaningful community level adaptation appears unlikely. Rather than focusing solely on what objective challenges exist regarding climate change, more fundamental questions must be asked as a starting point to develop planned adaptation at the community level such as: what do communities' themselves value in terms of adaptation? And how can local experiences, aspirations, and perceptions help shape the design and direction of planned adaptations? Looking at the problem from this perspective involves the need to account for how vulnerability to climate change is experienced in place, and across different sectors of society, as what people value and experience can determine what adaptation pathways people perceive as most valuable and important to them. As such, increased research which asks these fundamental questions is recommended.

There is a general perception in the scientific literature that barriers are defined as those perceived by outside stakeholders that inhibit their interactions with target populations and ability to implement adaptation effectively. However, there are also barriers that can be perceived from within communities themselves. These include the common inability of outside stakeholders to speak local languages, spend significant time in communities, and understanding and acknowledging holistically the local cultural context and traditional knowledge. As such, greater research exploring and detailing such barriers would be a beneficial future research direction.

The potential for maladaptation should also be considered as an important future research objective. This includes more detailed empirical material which evaluates maladaptation (similar to that presented in Chapter 4.0) resultant from adaptation. Further, research which looks to enhance theoretical knowledge of both what maladaptation means and how it can present is recommended. For example, can projects that fail but do not have obvious maladaptive outcomes (such as increased flooding or reduced food security), still be seen as maladaptive due to the psychological impacts that could occur such as reduced self-efficacy, motivation, and commitment to adaptation by local communities? It appears unlikely that failed adaptation will have no psychological impact on community members, and as such understanding the depths of this is important to understand the true impact adaptation is

having on those most affected. This is especially important considering the number of failed and unsustainable projects that have been implemented in the region to date.

6.5 Concluding Remarks

Climate change is impacting all regions of our world with Pacific Islands communities amongst those most vulnerable. As a result, adaptation to climate change is and will continue to be an important response to ameliorate such impacts. This thesis sought to contribute knowledge on the effectiveness and sustainability of adaptation projects implemented in rural Pacific Island communities, some of the most vulnerable in the world. The results from this thesis have shown that limited positive or sustainable outcomes have occurred despite projects being implemented within the five years prior to fieldwork. Rather, the presence of maladaptive outcomes has in some instances occurred. Owing to such adverse outcomes, a call to rethink how adaptation is being implemented, and who is driving goals and directions, is made. This is important if we are to safeguard the livelihoods of those communities at the frontline of climate impacts in our neighbouring PICs.

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Appendix 1: A livelihood analysis of resettlement outcomes: lessons for climate induced relocation

Place in Thesis

This Appendix was included in this thesis as it closely aligns and provides context and understanding to Chapter 3.0 (the case study of planned relocation). This Appendix provides a livelihood analysis from past resettlements and relocations to learn lessons for climate induced relocations. It has been accepted for publication in *Ambio* and is currently in press.

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Statement of Authorship for this Appendix

The conception and design of this chapter was undertaken primarily by the candidate (90%) and in part by Karen McNamara (10%). The analysis and interpretation was undertaken primarily by the candidate (80%) with assistance from Jasmine Pearson (20%) who assisted in the review and analysis process. This chapter was written primarily by the candidate (90%) with assistance from Jasmine Pearson (10%). Editing was done by the candidate (30%), Jasmine Pearson (10%), Karen E. McNamara (30%), and Patrick D. Nunn (30%).

Abstract

The resettlement of communities has occurred throughout time from a variety of drivers. More recently, relocation from climate change impacts has emerged in policy frameworks and on-the-ground initiatives. While there are few case studies of climate-induced relocation globally, this is expected to increase in the future. Exploring the livelihood implications of past resettlements is one way of better preparing for this. This paper reviews 203 resettlement case studies to evaluate the implications on livelihoods and extract key lessons applicable for future climate-induced relocations. Findings revealed physical outcomes as the only in which any improvement was seen while natural, social, financial, human and cultural outcomes fared worse. Key consideration for future relocations emerged surrounding: (a) land and compensation, (b) accounting for the issue of access to livelihood assets, (c) accounting for the intersections of vulnerability within a 'community', (d) explicit recognition and attention to the cultural dimensions of relocation, and (e) meaningful participatory planning.

1.0 Introduction

With the impacts resulting from climate change, both realised and anticipated, comes a new era of population mobility with the prospect that millions will be affected (Ferris 2015). It is however important to note that mobility (be it migration, displacement, or relocation) driven by climatic and environmental change, has been occurring throughout history (Tsonis et al 2010; Oppenheimer 2003; Turney and Brown 2007; Nunn 2007). Not only has it occurred, but mobility (in its various forms) has played an important role in the survival and livelihood resilience of populations (Barnett and McMichael 2018). Yet current climate change impacts and politicisation, coupled with an increasingly globalised and urbanised world, has resulted in mobility patterns being altered in new and evolving ways. For instance, this has been experienced in the Pacific atoll nation of Kiribati where a 'migration with dignity' policy was aimed at developing I-Kiribati educational and vocational skills in line with neighboring countries including Australia and New Zealand, thereby allowing residents to be better prepared for migration under an unfavorable future climate change scenario (Hermann and Kempf 2017; McNamara 2015). Across Europe and Northern Africa, there is likely to be an increased influx of migrants from parts of sub-Saharan Africa resultant from climate change impacts (Anon 2010). Climate change-related human mobility has also occurred on a more

localised scale with entire communities being displaced and resettled often to nearby locations (Barnett and McMichael 2018; Bronen and Afifi 2010).

Across the world, populations have been displaced and resettled as a consequence of a range of drivers. These include infrastructure and development, urbanisation, agricultural expansion, conservation, war and conflict, and environmental disaster (Chen, Tan and Luo 2017; Manatunge et al 2009; Mclean and Stræde 2003). Displacement driven by development activities such as dam construction, mining, and tourism, known as DIDR, is arguably the most studied in terms of its design and outcomes. It has been estimated that roughly 15 million people per year are affected by DIDR (Terminski 2013). The displacement of people from DIDR primarily occurs to aid greater economic development. For example, throughout China the building of large-scale dams is a core aspect of its national economic development strategy and goals to alleviate economic inequalities throughout the country (Galipeau, Ingman and Tilt 2013). Alongside the benefits that DIDR can bring, an extensive amount of research has attempted to understand the complex and negative consequences that this type of population displacement and movement poses to the lives and livelihoods of those resettled (rather than downstream beneficiaries) (Terminski 2013). Such implications for affected people have been widely documented within the DIDR literature and categorised as homelessness, joblessness, landlessness, marginalisation, increased mortality, food insecurity, expropriation, and social disarticulation (Cernea 1997; Kirchherr and Charles 2016).

Climate change is likely to increase the need for future relocations resulting from both current and projected climate change impacts. This new era of displacement and resettlement of communities as a result of climate change has been labelled differently in both the literature and policy platforms as: planned relocation (UNHCR 2017); climate-induced resettlement (Lopezz-Car and Marter-Kenyon 2015); community relocation (Campbell 2010); and climate-induced relocation (Bronen 2015; McNamara et al 2018). Defining the specific terms ‘relocation’ and ‘resettlement’ is somewhat contentious (Campbell 2010; McAdam and Ferris 2015). Some refer to the term relocation as only the movement of people from one place to another, while resettlement is used to refer to the rebuilding of livelihoods in a new location (Ferris 2015). In 2010, the COP to the UNFCCC stated that parties should enhance understanding, coordination and cooperation with regard to climate change induced

displacement, migration and planned relocation (UNFCCC 2011). Since then, the United Nations High Commission for Refugees (UNHCR) has established guidelines to assist countries dealing with planned relocation. In these guidelines, UNHCR define relocation to include the process of resettlement, stating planned relocation is when "a community is physically moved to another location and resettled there" (UNHCR 2015: 10). Throughout this paper, we will refer to the movement of people by climate change impacts as climate-induced relocation.

Recognising the various ways climate change is and will continue to influence human mobility patterns, this research focuses its attention on the process of climate-induced relocation. Fiji is perhaps the most notable example of such as four *iTaukei* (Indigenous Fijian) communities have relocated with the assistance of the Fiji Government (Barnett and McMichael 2018; Charan, Kaur and Singh 2017; Martin et al 2018; Piggott-McKellar et al 2019). Furthermore, over 80 communities have been earmarked for future relocation (Republic of Fiji 2014), and suggestion that this could be as high as over 600 communities (Neef et al 2018). In other parts of the world including Alaska (Simon et al 2018; Bronen 2008; Bronen and Afifi 2010.), Mozambique (Arnall 2014), Papua New Guinea (Connell 2016; Lipset 2013), Vietnam (de Sherbinin, Warner and Ehrhart 2011) and Solomon Islands (Simon et al 2018), communities have also begun undertaking the complex process of climate-induced relocation.

Given this new era of displacement, relocation and resettlement driven by climate change, along with and exacerbated by other drivers, there is potential to draw lessons from the depth of research available from DIDR, along with other forms of displacement and resettlement, to apply to future climate-induced relocations. Yet in doing so, care must be taken when attempting to compare these processes, as other forms of resettlement are distinctly different from climate-induced relocation, particularly in terms of processes such as political motivation, resources (monetary and physical), and timing (lead times and deadlines) (Ferris 2011). While acknowledging these differences, there is still significant overlap and opportunity to offer insights into climate-induced relocation, with numerous researchers already drawing these links (see Arnall 2018; de Sherbinin et al 2011; Ferris 2015; Ferris, Cernea and Petz 2011; McAdam 2014; McAdam and Ferris 2015; Wilmsen and Webber 2015). For example, a study by Wilmsen and Webber (2015) note five similarities between DIDR and climate-induced relocation as follows: 1) both result from human actions, 2) often having long lead times to

plan for resettlement, 3) resulting in livelihood impacts, 4) those most affected are the least powerful, and 5) there is limited international protection. A recent study by Arnall (2018) draws lessons from state-led resettlements across Africa and Asia to apply to future climate-induced relocations, while similar links have been explored in Pacific Island countries from historical displacement and resettlement cases (McAdam 2014; McAdam and Ferris 2015; Tabe 2019). Further, de Sherbinin et al (2011) note there is a possibility that existing policy and legal frameworks used to determine processes of DIDR may be applied to climate-induced relocation.

The relationship between climate change and DIDR is more connected than applying lessons from previous DIDR cases to climate-induced relocation. de Sherbinin et al (2011) argue that greater attention must be attributed to climate change not only displacing people from direct climate-related impacts (such as sea-level rise, increased intensity of storms surges, prolonged periods of droughts) and subsequently leading to climate-induced relocation, but that climate change adaptation and mitigation programs and initiatives themselves can result in displacement and resettlement. For example, the increased development of dams for water storage and hydropower, biofuel expansion and wind farms implemented to combat levels of GHG emissions, and large-scale seawalls and other coastal defences have all been identified as causing displacement and relocation of populations (see de Sherbinin et al 2011).

With this context in mind, the impetus for this study is threefold. First, climate change is likely to increase the likelihood and need for people to relocate and resettle in areas of lower environmental risk in the future (Adger et al 2012; Ferris 2015). Second, resettlement effects people's livelihoods (Cernea 1997; Terminski 2013) thus making it important to understand. Third, there exists a range of lessons from empirical resettlement case studies and literature that can provide insights into the livelihood futures for climate change affected communities (Wilmsen and Webber 2015). Building off previous literature which asks, what can be learned from resettlements (specifically DIDR) when planning for climate induced relocation (Wilmsen and Webber 2015), the aim of this study is to do so with a livelihood lens, through exploring and synthesising the livelihood outcomes of past community resettlements, as documented in the peer-reviewed literature. Two associated research questions guide this study: what has been the extent and variation in livelihood outcomes for affected communities post-

resettlement?; and, what lessons from these resettlements exist that can be applied to future resettlements, particularly climate-induced relocations?

2.0 Livelihood Analysis

Owing to the significant impact that resettlement can have on the livelihoods of affected people and communities, a livelihood analysis is applied in this research. Livelihoods is a term used widely within the literature and defining "what is a livelihood, and how can you measure it?" can be challenging. The Sustainable Livelihoods Framework (SLF) is a widely used tool in both development-based organisations such as OXFAM, CARE and UNDP, as well as by researchers (Ferrol-Schulte et al 2013). The SLF was established to understand how people generate a livelihood and how to most appropriately and effectively design human development initiatives accordingly (Scoones 1998). The SLF considers livelihoods to be people's ability to access assets across five categories (natural, social, financial, human and physical). These assets go beyond what people utilise to build a livelihood, but further represent people's capacity to be and act (Bebbington 1999). These assets both influence and are influenced by their interaction with the external context (i.e. shocks, vulnerabilities and trends) as well as transforming structures and processes (such as organisations, cultural norms and governance structures). These structures and processes influence the livelihood strategies employed and result in livelihood outcomes (e.g. increased adaptability to climate change, food security, poverty reduction) (Morse and McNamara 2013). Despite its prominence, there are many criticisms of the SLF. These include its lack of inclusion of power dynamics which can influence access to livelihoods (De Haan and Zoomers 2005) and a lack of accountability of the wider factors and influences that lead to poverty in the first place (Biggs et al 2015; McDowell 2002). Despite these criticisms, the SLF remains an important and useful lens through which to understand livelihoods.

The SLF's asset pentagon (natural, social, financial, human and physical) along with the inclusion of 'cultural' is used to guide the analysis in this research. 'Cultural' has been included for two reasons. First, other researchers have included 'cultural' as a distinct category in previous research (Bebbington 1999; Emery and Flora 2006). Second, the impacts of moving people from their land, as is often the case in resettlement, has a strong cultural component and thus it is important to consider. This is especially so as in many traditional cultures, which

are disproportionately impacted by resettlement (Terminski 2013), land is an integral aspect of identity, spirituality, and broader cultural significance (Campbell 2010). As such including it here allows for a more holistic understanding of the impacts and outcomes of affected people's livelihoods.

In this paper, the SLF asset pentagon is used to aid in framing the outcomes of resettlement for affected people. By using this approach, we can understand the wider implications on livelihoods by moving further away from the simplistic financial focus of livelihood rehabilitation often employed in resettlement research and practice (Mathur 2013). This is of particular importance as the UNHCR recommends in relation to climate-induced relocations that, "States should ensure at a minimum the restoration, but ideally the improvement, of livelihoods of Relocated Persons as both a matter of right and as an essential component in preventing impoverishment" (UNHCR 2015: 24). It is also important to understand that while a purpose is served by extracting and defining these categories of livelihood outcomes, there is significant overlap across them and often debate about which falls into which category (Scoones 1998). This is exemplified in the literature where the same asset has been attributed differently (see categorisation of livestock in Mallick and Sultana 2017, and Hang Bui and Schreinemachers 2011). Table 8 provides a guide to the categorisation of the livelihood assets used in this analysis.

Table 8: Livelihood categories - definitions and examples.

Capital	Definition	Examples
Natural	The natural resources used to provide resources and services for livelihoods, such as land, water and climate.	Land size, land quality, access to common resources (forests, rivers, oceans etc.), crop quality and diversity, livestock, food security.
Social	The social fabric and networks through which people interact, build relationships, and share resources on a daily basis.	Relationships, community cohesion, community groups, relationships with government and private sector, sense of place.
Financial	The financial resources people use to achieve livelihood objectives. Accounted for by both available stocks, and flows of income.	Income, savings, access to loans/borrowing, compensation, expenses, remittances.
Human	The skills, knowledge, ability to work and good health that enable people to pursue different livelihood strategies.	Access to and availability of services for education, skill building, health, employment and safety.
Physical	The basic infrastructure and goods needed to support livelihoods.	Housing, infrastructure, access to water, provision of services, facilities and amenities, transportation, access to markets.
Cultural	The set of constructs and rules for constructing the world, interpreting it, and adapting to it.	Connection to land, religion, language, rituals, traditional practices.

Based on: Downing and Garcia-Downing 2009; Sati and Vangchhia 2017; Scoones 1998

3.0 Methods

The following section describes how this archival research was undertaken. The search criteria, method employed, and data analysis are first discussed, followed by some of the limitations of this process.

3.1 Defining 'Community Resettlement'

As this research takes the position of detailing 'community' resettlement (i.e. the resettlement of a community) the parameters through which this research is defined must be established. Acknowledging the term 'community' has its limitations and ambiguities (Buggy and McNamara 2016; Titz, Cannon and Krüger 2018), it was chosen largely because of its wide use within the literature. As such, the parameters of a 'community' as well as 'community resettlement' were established to allow for appropriate and relevant literature to be selected for the purpose of this review. In this research, a community is defined as a social group of any size residing in the same specific location and under the same government umbrella (Schabas et al 2016). From this, a set of parameters relating to 'community resettlement' were selected to include and exclude case studies.

The first parameter was that resettlement projects needed to involve a significant portion of a community, resettling from one location to another. This further included: cases of two or more communities amalgamating in a new location to form a new community; one or multiple communities amalgamating with an already established community; as well as cases of one community being resettled into a number of locations, with either new or already established communities. Second, the resettlement projects had to involve the permanent, not temporary, resettlement of a community. Third, the resettlements, or a significant portion of, had to have been completed at the time of the research. Fourth, to align with the aim of this research, case studies needed to be empirical and include experiential information from communities along with sufficient detail on the outcomes of the resettlement project for those affected by it.

3.2 Search method

An initial search of the academic literature was undertaken in August 2017 using Scopus. This was chosen due to the heavy importance placed on social sciences within this database (McNamara and Buggy 2017) which is especially relevant to this research. The search involved two separate search terms: 'community' AND 'resettl*, and 'community' AND 'relocat*'. The asterisks (*) were used to ensure the suffixes '-ment', '-ed', and '-e' were all accounted for in the search. The search term 'community' was added for two reasons. First, this research is aimed at cases where a 'community' (see Section 3.1) has been resettled. Second, by applying this condition, the number of results was substantially reduced from >40,000 which was the number identified without the use of 'community' in the search term. The search was also limited to the social sciences, and academic peer-reviewed papers, with no time limits imposed. A second search, using the same criteria, was undertaken in June 2019. This was done to expand the literature sources to include books and book chapters, as there are a number of seminal works on DIDR and other forms of displacement and resettlement available from these sources. Further, this additional search updated the academic peer-reviewed literature.

Once the searches had been completed, a three-step method for the final selection of sources was used. The three steps were: 1) screening the titles; 2) screening the abstracts; and 3) a full text read. The criteria used to define 'community resettlement', which served the basis for

inclusion or exclusion, are described in Section 3.1. The 'snowballing' method was used to identify any new references from the reference lists of the selected sources. The same criteria were used to exclude or include new papers. These steps are outlined in Figure 16, showing how many papers passed each step. In total, 142 sources were identified for analysis (see Supplementary Material for full list of accepted sources).

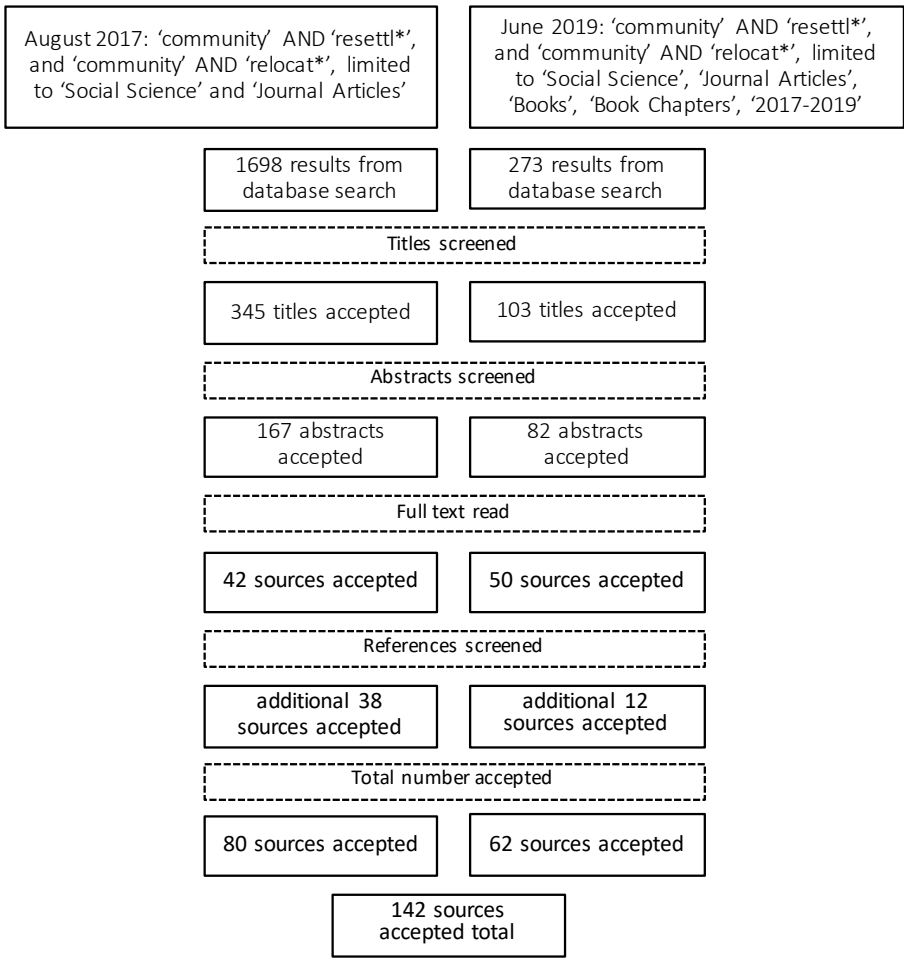

Figure 16: Search method utilised, along with the number of articles accepted at each stage

3.3 Data analysis

Within the 142 sources identified, 36 of these analysed multiple case studies. This was through a comparison between different resettled communities, a host and resettled community, or a comparison of the same (resettled) community over two different time periods (for example after 2 years post resettlement, and then again after 10 years post resettlement). These have been included as additional case studies to account for this, bringing the total to 203 case

studies. It is also important to note that numerous resettlement schemes were discussed in different sources, each offering different perspectives, having been researched at different times, or with a different focus, or by different people.

To analyse data, an Excel database was created. General information such as the year of resettlement, year of study (or publication date if not available), driver for resettlement, and location was extracted. Further, the outcomes of each case study were extracted and categoried in the database based on the livelihood outcome discussed. Once all the outcomes within each case study were disaggregated, a content analysis was undertaken. This process involved making evaluative judgements of the text and categoriing it (Leavy and Prior 2014) as negative, neutral, or positive. A negative outcome was selected if there were overwhelmingly negative outcomes across that livelihood category for the affected population. For example, taking the example of physical, significantly reduced access to electricity for the majority of the resettled population would yield a negative response. A neutral outcome was selected when there was no change since the resettlement, or a balance between negative and positive outcomes. For example, there might have been improvements in access to one service, such as water, yet reduced access to electricity. A net positive outcome was declared when there were improvements on average, for a majority of affected people. For example, if there was an improved provision of electricity, and access to water and transportation, yet a decline in the size of houses, this was considered positive overall. If the case study did not report any outcomes for physical, it was marked as such.

3.4 Limitations

There are some notable and significant limitations to this study. These exist primarily around the search method and analysis. First, the use of the search terms 'community' and 'resettlement' has limited the scope of this analysis. For example, there is literature on resettlement that is discussed under other terms such as migration and displacement. In addition, within resettlement practice and research, there is a large field outside of academia. As such, the exclusion of grey literature from this search meant several case studies were not included. Further only English literature was used, and the search was undertaken in just one search engine (Scopus) which presents a further limitation to the scope of the study. These factors could all contribute to the search method missing relevant case studies. However, given

that this research is primarily aimed at garnering lessons from the literature, the potential of missing some sources is not seen as a major downfall to the rigour of this study, especially as a significant number of cases (142 sources documenting 203 case studies) were identified and analysed. Another limitation of this study was the variation in information presented in the case studies, with some sources providing an in-depth quantitative and/or qualitative analysis while some provided only a descriptive overview. As such, authors' discretion was used to determine whether a livelihood outcome was detailed enough to be included. Further defining outcomes as positive, neutral, or negative involved the authors making value judgments, albeit driven by the experience, based on the information published, which varied significantly. The implications of these limitations for this could be that the information presented in the sources was not holistically accurate and balanced, therefore skewing the outcomes of this analysis.

4.0 Overview of Resettlement Case Studies

This section provides a summary of the resettlement case studies (n=203) documented in the 142 sources. Based on the case studies reviewed, the construction of dams was the primary driver for community resettlement, accounting for just under half of all cases (see Table 9). Other development-induced resettlement followed, such as tourism, mining, and infrastructure, followed closely by conservation and natural disaster induced resettlements. There are five examples attributable to climate change, all from Asia and Oceania, with four published in the last five years (2015-2019).

Table 9: Overview of the drivers, location, year of publication, year of resettlement, and time between resettlement and study.

Driver	
Dam construction	49.3%
Natural disaster	12.3%
Development	15.7%
Conservation	13.3%
Livelihoods	6.9 %
Climate Change	2.5%

Location	
Asia	70.5%
Africa	20.7%
North America	1.5%
Oceania	3.4%
Central/South America	3.4%
Europe	0.5%

Year of publication	
2015-2019	25.8%
2010-2014	27.3%
2005-2009	31.9%
2000-2004	8.8%
< 2000	6.2%

Year of resettlement	
2010-2019	13.7%
2000-2009	26.7%
1990-1999	31.1%
1980-1989	8.7%
1970-1979	7.5%
< 1970	12.4%

Time between resettlement and case study	
< 2 years	8.9%
3-5 years	10.3%
6-10 years	23.3%
11-20 years	32.2%
21-40 years	17.1%
> 40 years	8.2%

In terms of location, Asia had by far the highest number of examples with 70.5% coming from this region (Table 9). This can be attributed largely to Asia housing a large concentration of hydropower dams (Stanley 2011). Africa followed as the next most common region, followed by Oceania and Central/South America.

The dates of resettlements span from as early as 1945 with the highest concentration during the 1990s and 2000s, together accounting for over half (57.8%) of the total. This is due to the high economic growth during this time, with dam construction accounting for the subsequent energy needs (Terminski 2015). In terms of publications, the highest concentration came during the period 2005-2009 (31.9%). Most studies were undertaken between 11-20 years of when the resettlement occurred, followed by between 6-10 years. The least number of cases were studied over 40 years from when the resettlement occurred (8.2%).

5.0 Implications and Outcomes for Livelihoods

The following section explores the implications and outcomes for livelihoods using the six livelihood categories as a framing for exploration. Figure 17 shows how many case studies reported, or did not report on, livelihood outcomes across natural, social, financial, human, physical, and cultural asset categories.

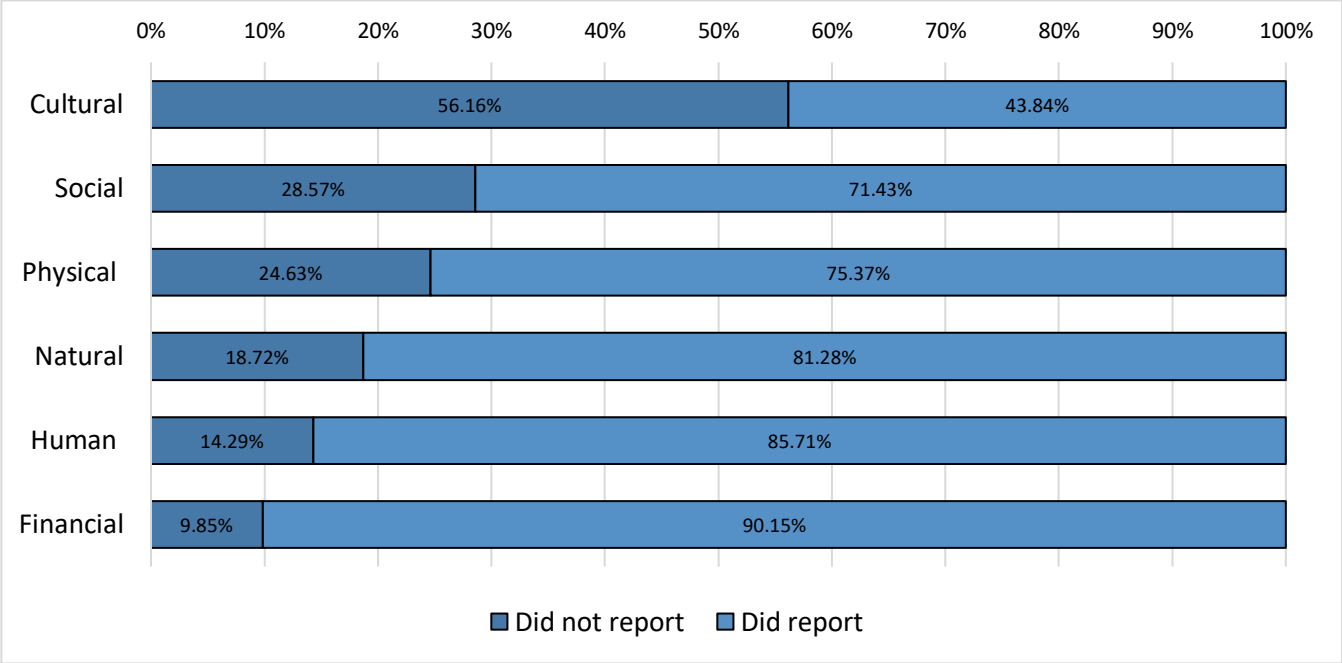

Figure 17: The percent of case studies that described an outcome across natural, social, financial, human, physical, and cultural asset categories.

Cultural outcomes were reported on at a lower extent than any other, with only 43.84% of case studies describing associated impacts. Social outcomes were the next least reported on, with 71.43% of case studies discussing them. Physical (75.37%), natural (81.28%), and human outcomes (85.71%) then followed. Financial outcomes were the most commonly reported on with 90.15% of case studies discussing them. This exemplifies the greater focus on the financial component of re-building livelihoods following resettlement.

The case studies that had either positive, negative, or neutral livelihood outcomes (based on the method described in Section 3.2) show that all, except physical, had a greater portion of negative outcomes than positive (see Figure 18). Cultural outcomes fared the worst, with 84.27% of case studies that reported on cultural outcomes, reported it negatively. Natural

followed with over three quarters of cases that described it stating worse outcomes (76.97%). Social (68.97%), financial (63.39%) and human (56.32%) closely followed with high percentages of negative outcomes. Physical saw over half (58.17%) of case studies that reported, noting positive outcomes with under a third (30.72%) reporting negative outcomes.

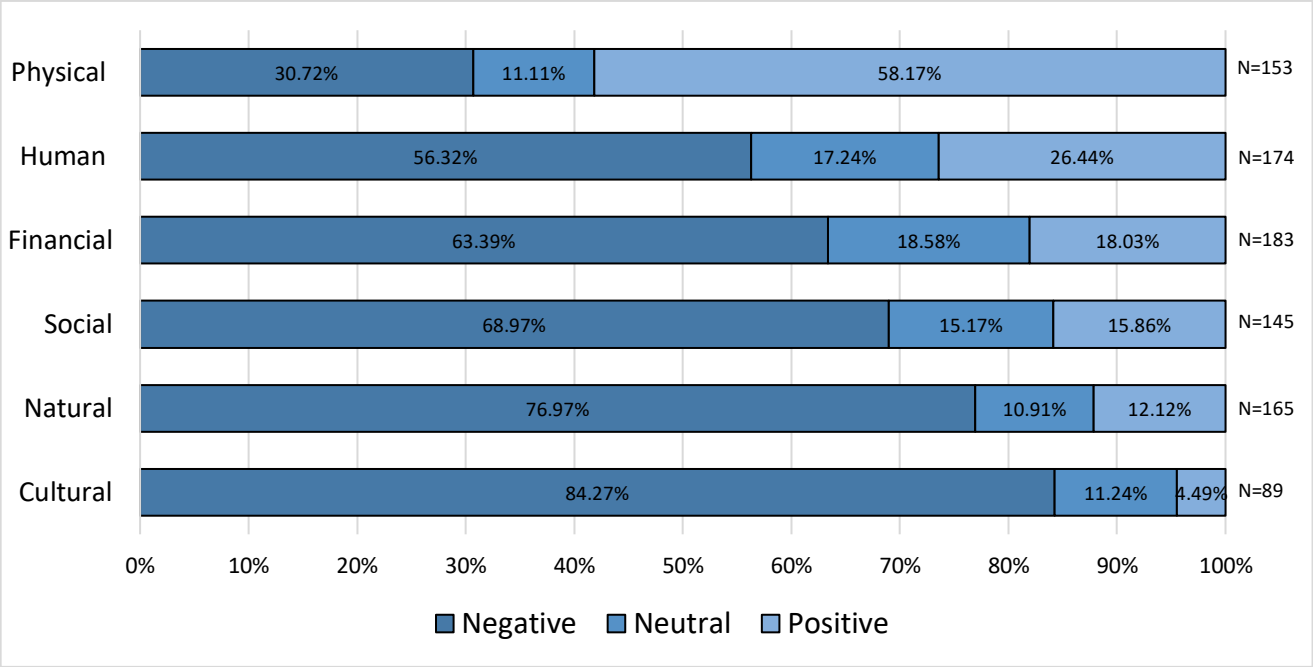

Figure 18: The percent of case studies that described an outcome as positive, neutral, or negative, across natural, social, financial, human, physical, and cultural asset categories.

One key aspect to consider pertaining to livelihood outcomes post resettlement, is their potential to improve over time. For example, modifying an earlier framework by Scudder and Colson (1982), Scudder (2005) presented a four-phase model of resettlement which considers this temporal element of livelihood restoration post resettlement. The model begins with phase one, where a high level of stress within a resettled community exists due to the uncertainty surrounding the future, to phase four where resettled people are fully integrated into the economy and self-sufficient. This model indicates that over time livelihood outcomes will improve as people become more familiar and adjust to their new surrounds. However, if resettlement is not done properly, these stages will not occur (Scudder 2005). One example of this temporal aspect at play is a case study of social networks from Indonesia and the Philippines which revealed community leaders and household heads will eventually replace disrupted social networks after a period of time in a new community (Quetulio-Navarra,

Znidarsic and Niehof 2017). Yet, the degree to which this temporal component plays out across displacement and resettlement case studies is equivocal. In a seminal study on the outcomes of World Bank driven dam-induced resettlement, Scudder (2005) states there is no evidence of an improvement in livelihoods for a majority of people over time. This study reinforces this finding, with no evidence of a temporal improvement in livelihood outcomes overall, across this review.

5.1 Natural

Loss of access to common (shared) property assets was a significant issue. Negative outcomes occurred pertaining to the loss of access to supportive resources, such as rivers, forests, wild foods and animals. For example, in the case of a hydropower dam construction in Malaysia, the community lost access to the river and forest where they previously hunted, collected and foraged for food, and had access to clean drinking water. As they expressed it, they lost access to their 'supermarket', which impacted their local economy as they could no longer rely on unlimited/free access to natural resources (Jehom 2013). Neutral or positive outcomes were rarely identified with regards to common natural resources, only occurring when people were resettled close to their previous homes, maintaining access to these common resources.

Landlessness refers to a lack of access (or entitlement) to land (Sati and Vangchhia 2017). People experienced landlessness either through not being directly compensated with land, not being provided with secure land tenure or, as described in a case study from Nepal, having to sell land they were given owing to the difficulties of life after resettlement (Lai Ming and Saumik 2013). In a community in the Philippines resettled after a volcanic eruption, the lack of legal ownership of land resulted in people becoming fearful of forced eviction by the government (Gaillard 2008). Women can also be more vulnerable to landlessness, as described in a case study in Malaysia: when women are dispossessed from their traditional lands, their vulnerability is significantly exposed as they cannot legally acquire property (Yong Ooi Lin 2006).

In terms of land size, this predominantly decreased after resettlement. In a case study from Vietnam, a hydropower dam construction was reported to have reduced 79% of original land size for the affected community (Hang Bui and Schreinemachers 2011). An increase in land size

was reported only in a few case studies. A reduction in land quality was another common theme. Roughly four times the number of case studies reported a decline in the quality of land in the new location. The common decline in both size and quality of land led to reductions in crop production and diversity of food sources, and in some cases food insecurity resulted. For example, a case study in Laos where people relied on rice prior to the resettlement, 95% had rice deficits after the move (Delang and Toro 2011). A reduction in livestock was also widely identified across case studies. This stemmed largely from the loss or reduction of land size which resulted in there not being enough space for animals to live and graze, nor to produce feed for them.

5.2 Social

Cases that involved the integration of communities into already-established communities, or bringing together two or more communities into a new location, overwhelmingly reported negative social outcomes. Resettlements involving host communities invariably resulted in disputes over land given that the host community gave up land for the incoming population with often inadequate compensation. Conflict extended beyond land to other resources such as competition over health services and other communal resources, causing hostility, exclusion, feelings of isolation as well as physical threats. Other negative outcomes due to multi-community integration were power dynamics between different communities, a breakdown of social networks and ethnic tensions. For example, a case from a dam development in Chile noted that there were severe ethnic tensions from the integration of Indigenous and non-Indigenous peoples and, despite efforts to resolve this, the tensions remain significant (Gonzalez and Simon 2008). Few case studies indicated some form of positive interactions between new village members. This included people adapting easily to this transition after a dam-induced resettlement in Indonesia (Sisinggih, Wahyuni and Juwono 2013), the maintenance of strong social ties despite kin groups being dispersed, described from a resettlement in Inner Mongolia (Rodgers and Wang 2006), as well as reduced isolation, and greater collaboration and assistance amongst communities. Case studies where communities remained together had more equally distributed outcomes.

The resettlement case studies reveal a number of major changes to social life and structure due to lifestyle changes. These included a more urban and modern lifestyle, limited economic

opportunities, excess free time, and a loss of livelihood resources often resulting in alcohol abuse and other antisocial issues. An example from Malaysia as a result of a dam construction described how the younger males lost access to the river, previously an essential livelihood source, which was linked to increased abuse of alcohol (Swainson and McGregor 2008). Across these examples, this rise in alcohol abuse has led to social tensions and a feeling of insecurity and lack of trust within new settlements, and has also been attributed to a decline in cultural practices (Kingston and Marino 2010).

Resettlement entails enormous change in terms of village layout, communal spaces and housing. These case studies showed how these physical or infrastructural changes impacted significantly on social networks. An example showcasing this comes from the King Island Indigenous Alaskan community where the physical closeness of houses was of traditional importance as it represented the connectedness of village members. When resettled, the new location had a completely different layout and the sense of community and closeness was lost (Kingston and Marino 2010). Similar outcomes arising from an altered layout impacting social networks are discussed in multiple case studies. Yet, in one case, positive social outcomes resulted from the design of houses. This stemmed from the incorporation of local NGOs which were well versed in designing houses for urban poor and incorporated areas for supporting social cohesion into the design (Cronin and Guthrie 2011). Another major issue was the breakdown of communal interactions. This was attributed largely to the lack of prioritiation of social and communal spaces. A tourism-induced resettlement in China described the new village as a 'bedroom community' as interactions have been reduced because public spaces were omitted from the new design and layout of the village (Wang and Wall 2007).

There are many important benefits of strong social networks such as avenues to loan and access money from neighbors and families. The dislocation of communities often leads to these networks being broken. This is apparent in numerous cases here where there are fewer exchanges between households. In one instance in Inner Mongolia, it was noted that labor exchanges amongst community members were still strong, which was a case where households resettled and remained close to each other, with the same neighbors and subsequent strong social connections (Rodgers and Wang 2006).

5.3 Financial

The associated financial costs of resettlement often proved a significant burden for those affected. This was in part due to improvements in access to facilities and services (described in Section 5.5) that incurred a financial cost. The cost of electricity was cited as a primary issue. Resettlement due to flooding in Mozambique showed that, despite having access to electricity, most households reported not being able to use it due to its prohibitively high costs (Arnall et al 2003). Other expenses included the daily costs of a more urbanied lifestyle where people have to buy most of their food, and catch transport to school, work, and town. This was well illustrated by a case in Inner Mongolia where people could not afford to catch the bus, and as such could not access the opportunities of markets in the city (Dickinson and Webber 2007). Prior to the resettlement, in many such instances, these activities were free.

There was an abundance of negative outcomes documented in the case studies related to compensation. Key issues included the amount of compensation received not being sufficient in the opinions of those receiving it, delays in receiving compensation, as well as not receiving the full amount promised. An example from a DIDR in India stated that female heads of households could not access compensation; only males could (Asthana 2012). Related issues included people not being compensated for direct assets such as crops that were in the early stages of growing – and therefore valueless – when the resettlement occurred. This was especially pertinent with poorer groups. On the contrary, there were some positive outcomes in terms of financial capital, which came from compensation being adequate and appropriate to the expectations of the affected group.

While tied largely to employment (discussed in Section 5.4), there were negative outcomes surrounding income and savings after resettlement. This included income streams no longer being stable, reduced, or completely lost after resettlement. People were also not able to save money, or had to use what little savings they had accumulated during and after the resettlement to rebuild their livelihoods. Many people had to borrow or take out larger loans that led to indebtedness. In saying this, the availability of loans and subsidies to resettled people was seen as a positive improvement in many cases. In one case study from Turkey, the government provided free services to those resettled (Akça, Fujikuraand Sabbağ 2013). Another positive example was from the Philippines where the provision of and access to micro-

financing resulted in greater livelihood opportunities after resettlement (Usamah and Haynes 2011).

5.4 Human

Negative outcomes pertaining to loss of employment or job insecurity were common. This occurred primarily because of the move from a subsistence lifestyle to urban areas where there are limited jobs and people lost their capacity for subsistence. The migration of people in search of work, causing greater disruption at home and social disarticulation resulted from this. Difficulty attaining stable and sufficient employment was especially noted amongst the elderly population who did not have the skill set to gain employment in new areas. This is shown in a case study from China by a comparison of ages and rates of unemployment: 3.3 % for the 18 to 30 age group, 5.9 % for the 31 to 50 age group, 26.1 % for the 51 to 60 age group, and 68.9 % for the over-60 age group (Tong et al 2017). Numerous studies noted specifically a lack of appropriate skills and training to help people enter a new stage of employment. The term 'appropriate' is key here as it was recognied that, while training was provided, it was neither long enough nor sufficiently relevant to what the communities needed. It is also important to note that there were instances where training and skills provision was deemed successful, and resulted in positive employment outcomes.

Substantial gains in access to, and improvements in, education were noted. Greater access to schooling through the provision of new schools in the area, or being closer to established schools through moving to more urbanied areas accounts for this. On the contrary, multiple case studies noted that access to education has become worse. A case study from Malaysia stated there was the provision and building of new schools yet no teachers to work there so the facilities remained unused (Swainson and McGregort 2008). Another case in India from a development-induced resettlement showed an 18% dropout rate of school students after displacement due to difficulty in accessing schooling (Patel, Sliuzas and Mathur 2015).

In terms of health, numerous case studies reported positive outcomes in terms of access to and improvement in health-related facilities. Yet, negative health outcomes were noted due to having to travel further distances to access health facilities, while in other cases it was increased incidences of disease, which in some cases lead to increased mortality. One example

from Turkey stated that the resettled community experienced higher levels of obesity due to the profound change in diet (Akça, Fujikuraand Sabbağ 2013). There were also reports of increased incidents of stress and other negative mental health outcomes after resettlement.

5.5 Physical

One of the most commonly reported improvements to people's livelihoods in post-resettlement contexts refers to access to services. Improvements in access to electricity was the principal improvement. While improvements were generally seen in this area, there were cases were this was reduced. For example, a case from a resettlement driven by an airport expansion in Tanzania found that prior to resettlement, 95% of people had access to electricity, this dropping to a mere 8% post-resettlement (Mteki, Murayama and Nishikizawa 2017). While it is evident that there is room for improvement, there is a still a large majority of cases where increased access to services occurs. This is in many cases due to the transition to more urban areas where these services already exist. Greater access to water, transport, and communications was also identified.

Public infrastructure is another aspect that invariably improved with the building of schools, health centers, shops and restaurants, and roads. While this is important, issues of delays in finishing or simply never finishing were widely raised. In terms of housing, there were more mixed outcomes. The provision of new housing was stated as a positive in many instances with improvements in size, the addition of bathrooms and kitchens, flush toilets and solar panels, and improved structure of houses. On the contrary, instances existed where the provision of housing was either incomplete or ill-suited to the lifestyle or needs of the community. An example from a tourism resettlement in China stated that while a new modern kitchen was provided, this was not the way people wanted to cook, and they also did not include a shrine room in the house design which is important for them (Wang and Wall 2007). There was generally significant improvement in access to appliances and other household goods after the resettlement, particularly vehicles, fridges, televisions, phones, and stereos. This was primarily from monetary compensation.

5.6 Cultural

The loss of connection to land and place was expressed throughout the case studies, through a sense of loss from being moved away from familiar ancestral local environments. This was

shown well in a case study from Inner Mongolia where attachment to the old village site and the mountains remains strong and imbued with meaning for which there is no substitute (Rodgers and Wang 2006). The impact on religion and associated practices was also noted. For example, a lack of places of worship in the resettled site or the enforced integration of multiple religions into the new location often resulted in reduced religious practice. By comparison, a case study community in Indonesia illustrated how the process of resettlement served to strengthen religious practices and increase religious activities in the community (Nakayama 1998).

There was also a noted significant change in the type and quantity of traditional rituals and practices undertaken by people. An example from a dam development in Malaysia showed that the traditional practice of 'ngajat' (a traditional welcoming dance) is no longer practiced due to the preoccupation of earning money and integration into a more modernied society (Choy 2004). The change in lifestyle, in many cases away from traditional means of fishing and agriculture has resulted in both the loss of traditional practices of hunting and farming, as well as the erosion of traditional knowledge of these areas and their history. A case from the King Island community from Alaska expressed the loss of language as the village has been integrated into a more modern society with the benefits of English speaking becoming more pronounced. Now, none of the younger generation speak the Iñupiaq dialect (Kingston and Marino 2010).

6.0 Lessons for future climate-induced relocations

Climate change is ushering in an evolving era of human mobility both through direct climate-related hazards as well as the implementation of mitigation and adaptation projects that displace people from their homes and lands. Within the resettlement literature and in practice, it is commonly understood that the implications for livelihoods of affected people can be disastrous (Cernea 1997; Cernea and McDowell 2000; Colson 1971; Scudder 2005). This review serves to replicate such findings and bolster these critiques. It details how physical outcomes, accounting for tangible aspects such as provision of services, improved community infrastructure and housing, was the only area in which most resettled communities witnessed any real improvements following resettlement. Across natural, social, financial, human and cultural assets, outcomes were generally negative post-resettlement.

If the findings from this review are in any way representative of the future of climate-induced relocation, this is extremely concerning. As such, this research has the potential to contribute to existing policy frameworks for climate induced relocation including the UNHCRs guidelines in which impetus and importance is placed on, in the least restoring, but preferably improving the livelihood outcomes for affected communities post relocation (UNHCR 2015). In addition, other guidelines which exist pertaining to disaster-induced relocation and resettlement which have strong links to climate induced relocation, including the Inter-Agency Standing Committee's (IASC) Operational Guidelines and World Bank guidelines are of significance. For example, the IASC Operational Guidelines, which adopt a human-rights framing, identify a key guideline that resettlement should protect the rights of affected people in relation to housing and livelihoods (Oliver-Smith and de Sherbinin 2014).

This review therefore provides lessons from the experiences of previous resettlements in an effort to move towards better livelihood outcomes for affected populations in this new era of human mobility. Owing to the differences in contexts of each case study analyed (such as geographical location, drivers of resettlement, involvement of affected people, and the framing of research, as well as the complex underlying and dynamic political, economic, and socio-cultural differences), these key themes are not intended to be prescriptive but rather draw attention to some broad lessons and considerations common across a majority of case studies. These key themes are (a) land and compensation, (b) accounting for the issue of *access* to livelihood assets, (c) accounting for the intersections of vulnerability within a 'community', (d) explicit recognition and attention to the cultural dimensions of relocation, and (e) meaningful participatory planning. Each of these themes are discussed separately below.

Land and compensation. The results from this review found only 12% of cases showed an improvement in natural capital (such as land size and productivity, and access to natural resources) post-resettlement. Current examples of climate-induced relocations have largely been with rural communities (as is the case with most DIDR cases), where a heavy reliance on subsistence lifestyles and thus access to appropriate and suitable natural capital is a core aspect of livelihoods, making this finding particularly concerning. Considering the implications of this for future climate-induced relocations, executing land compensation in the form of just and appropriate land transfers, and land-based re-establishment accounting for size and

productivity potential of, as well as access to relevant and sufficient natural resources including access to common pool resources, becomes clear. Furthermore, issues of land rights must be accounted to include both those who hold informal or unrecognised land title, and to ensure that adequate provision of land rights is maintained in the new location so as to not undermine long-term land security. This is an area that may become increasingly problematic, particularly in some Pacific Island Countries, where land boundaries and tenure arrangements can be unclear and are not formally recognised (Campbell 2010).

The UNHCR Planned Relocation Guidelines aim to address concerns about land by specifying that equitable compensation must be provided to relocated persons pertaining to the loss of land and subsequent land associated assets (UNHCR 2015: 24). Yet despite almost all cases analysed in this review providing a form of compensation for the loss of land for affected people, compensation was often found to be inadequate and led instead to undesired outcomes such as deterioration in cultural practices and increased living expenses. This raises questions about what constitutes equitable compensation, in particular the use of monetary compensation for land, especially considering the loss of invisible assets and the ensuing implications for long-term livelihood sustainability (Witter and Satterfield 2014). One positive example of an appropriate transfer of land is that of a recent climate-induced relocation in Fiji where the community was relocated to a nearby site from which residents could maintain access to their previous land, as well as being provided with alternative livelihood provisions in the name of land-based resources (crops, cattle, and fishponds). This helped the successful land-based re-establishment as well as allowing the community to maintain spiritual ties to their land (Piggott-McKellar et al 2019).

Accounting for *access* to livelihood assets. Resettlement has the potential to improve access to resources and services for affected people, as documented in this review. This is especially pertinent in some regions of the world where rural communities lack access, namely to education, health care, employment opportunities, income, and electricity. Yet, in understanding the real and important potential resettlement can play in improving these assets, a deeper exploration of what access means must be considered. Examples of when resettlement projects failed to account for 'access' abound. For example, Galipeau, Ingman and Tilt (2013) identified a case from a DIDR in China that provided schools and medical clinics

to the community, yet these remained unused as there was no equipment and no qualified staff. Another example is the provision of electricity and services which, while important and beneficial, can lead to increased expenses and render the services impractical and unused if people cannot afford to use them, as described from a flood-induced relocation in Mozambique (Arnall et al 2003). Similarly, while transportation was newly available to resettled people to access markets and opportunities, in numerous cases this could not be used as the cost proved prohibitive. This is shown by a case study in Inner Mongolia where the cost to catch the bus to the city and back was almost the entire average daily wage, making it unlikely that anyone would utilie this service (Dickinson and Webber 2007). When discussing the restoration of livelihoods, it is not only meeting immediate and direct needs, such as providing a new service, but also looking at whether these services can actually be utilied by the affected population, as well as their long-term sustainability.

Accounting for the intersections of vulnerability. This review shows that the outcomes of resettlement are disproportionately felt by certain groups and individuals, making them more vulnerable to impoverishment. The disproportionate impact on women is seen through an example provided by Asthana (2012) in which, after being resettled from a dam construction, women could not access compensation solely because of their gender. This greatly affected female-headed households and widows, as in parts of India (as in many other countries) only men are recognied as official heads of households and are thus the only ones able to claim compensation (Asthana 2012). Greater risks also fall onto the elderly as they are often less educated than the younger generations, especially in rural areas from which most resettlements occur, and therefore are unable to adequately engage with the process. As described from a tourism-induced resettlement in China, the older population experienced significantly higher rates of unemployment compared to younger generations after resettlement for this reason (Tong et al 2017). The general failure to account for intra-community inequalities and vulnerabilities throughout the resettlement process can be seen as the World Bank themselves admit the failures they have made in dealing with resettlement in respect to more marginalied groups and individuals (World Bank 2015).

Climate change has been documented as disproportionately affecting those most vulnerable. This occurs both on a global scale in that developing countries, which contribute least and are

generally considered more vulnerable, are those that are most affected (Althor, Watson and Fuller 2016). Similar arguments apply within communities due to inequalities on the basis of gender, class, religion, and ethnicity (Yamin, Rahman and Huq 2005). Further, it has been shown that if climate change adaptation projects do not explicitly target existing intersections of vulnerability, they risk perpetuating them. When looking toward climate-induced relocation, there is an explicit need to recognie and target these intersections of intra-community vulnerability to ensure they are neither aggravated nor perpetuated. This can be achieved through considered community planning processes that explicitly aim to target an array of local voices rather than pursuing a more tokenistic level of community participation, or none at all (Mallick 2011).

Recognition of the cultural dimensions of relocation. Compared to other areas of livelihoods, this review identifies that there are limited studies focusing on the cultural implications of resettlement (with over 50% not discussing any cultural outcomes). Of the case studies that did discuss culture, it is clear that culture is impacted greatly through the process of resettlement with almost 90% of cases reporting negative outcomes. Such impacts on culture included declining use of traditional practices, loss of connection to land, languages being lost, and undesired and unanticipated impacts on religious practices (described in Section 5.6). Owing to both the limited detailed studies focusing on cultural outcomes, and the high rate of negative outcomes from those that did, this is seen as a key aspect to explore and understand further, especially within a climate change context. This is of further significance as the Planned Relocation Guidelines for climate-induced relocations state that an overarching principle is the preservation of culture for affected populations (UNHCR 2017: 11-12).

Downing and Garcia-Downing (2009) argue that while it is unlikely that post-displacement culture can ever be restored to its pre-displacement condition, largely because of a detachment from place, there are mechanisms that can be put in place to mitigate cultural impoverishment. As a first step, cultural impacts need to be understood, accounted and planned for with active participation of those likely to be affected. Benefits of following such steps can be seen with a recent climate-induced relocation in Fiji, where the village was relocated away from the coast due to shoreline erosion and tidal inundation. In this case, the burial site was moved so as not to be washed away; something extremely important to the

local community members (Charan, Kaur and Singh 2017). While the need to relocate such a site is irrefutably not ideal, it demonstrates the importance of understanding the cultural needs, impacts and outcomes of relocation and resettlement.

Meaningful participatory planning. Appropriate planning involving the affected communities should be incorporated into the climate-induced relocation process with the support of stakeholders such as relevant local NGOs and government agencies that can assist with specific needs of relocation such as human rights, land, and health. From this review, the benefits of having targeted and meaningful assistance can be seen from a case study from India where there was involvement of a local NGO that assisted with the design and layout of housing, through an understanding of social networks and preferred living arrangements (Cronin and Guthrie 2011). In a similar, yet opposing vein, negative outcomes resulted when the consideration of affected people's cultural and social needs pertaining to physical closeness of housing were not considered, as in the case of the King Island Indigenous Alaskan community (Kingston and Merino 2010). The involvement of affected communities must go further than just the planning process of relocation itself, but also through the initial decision to relocate. McAdam and Ferris (2015) discuss this challenge of 'consent' in the relocation decision, and how meaningful participatory involvement is an essential precursor to gaining this. These are essential things to consider and account for moving into a new area of climate-induced relocation.

7.0 Conclusion and future directions

This research used a livelihood analysis to explore outcomes for affected people after they have gone through the process of being resettled. This was done with the aim of learning lessons to enable best practice for future climate-induced relocations. The asset pentagon of the SLF was used to analye the results, looking specifically at livelihood outcomes across natural, social, financial, human and physical categories, with the addition of cultural assets. This analysis examined 203 case studies of empirical research exploring resettlements and the outcomes for those affected. It was found that the resettlement process overwhelmingly resulted in negative outcomes for affected people across natural, social, financial, human and cultural assets. The only area that saw, on balance, any benefit from the resettlement process was physical outcomes including the provision of services and infrastructural improvements.

From this analysis, key themes that should be considered moving into a new era of climate-induced relocation are identified. These include considerations of: land and compensation, the issue of *access* to livelihood assets, the intersections of vulnerability within a 'community', the cultural dimensions of relocation, and meaningful participatory planning.

As impacts from climate change will increase into the future, and more communities and governments face the complex reality of climate-induced relocation, it is essential that we learn from and draw on examples and understandings from previous community resettlements. As this review shows, there is significant room for improvement when re-building livelihoods following resettlement. Yet this also comes with major challenges. Moving forward, governments, the private sector, community groups, researchers and those at the frontlines should be working together more closely to ensure that livelihoods are rebuilt at an absolute minimum to pre-resettlement levels, but preferably improved in the resettlement site.

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Appendix 2: Focus Group Guide

GENERAL COMMUNITY INFORMATION: CHECKLIST

This method will be quite ad hoc and involve the collection of information (provided as a 'checklist' below) from a variety of sources: conversations and/or interviews with community leaders and members (formal and informal), participant observation, focus groups (method on p 3), and secondary data sources (project reports, government reports etc if available). The following 'checklist' indicates the specific type of information that needs to be collected for each community/village for this project. The below is a guideline, not an exhaustive list, and can be adapted as needed for each specific community. The checklist has been divided into eight categories: socio-demographics; institutions and governance; human assets and skills; water, energy and food security; social systems and assets; financial assets; natural resources; and physical infrastructure.

Socio-demographics

- How many people live in the community?
- How many households are there?
- What is the age distribution?
- What is the gender distribution?
- What religions are practiced (% of people)?
- What languages are spoken (% of people)?
- Literacy rate (% of people)?
- Over the last ten years, how many people have left the community? Why and where to? How many people have moved to the community? Why and where from?

Institutions and governance

- Who makes decisions on behalf of the community?
- How are decisions made and on what issues?
- How are community leaders decided on? How often are they decided on?
- What is the relationship and connection between this community and the local, regional/provincial and national governments?

Human assets and skills

- What health services are available directly in the community? How far is the nearest health centre (in kms)?
- Observe any prevention measures to mitigate mosquito-borne viruses.
- How many people (as a %) have completed: a. primary and b. secondary school?
- What schools (primary, secondary) are available in the community? If not located in the community, how far are the nearest (primary, secondary) schools (in kms)?

- Observe particular skills of locals.
- Observe any local knowledge (relating to stewardship of natural resources, monitoring changes, adapting to changes etc).

Water, energy and food security

- What are the most prominent sources of water (top 3)?
- What is the water quality of these most prominent sources?
- Does water availability vary throughout the year? If so, how?
- Observe the water distribution and storage systems.
- What are the main sources of energy in the community – for cooking, lighting and electricity?
- Are these energy sources adequate and reliable?
- What are the main foods eaten in the community?
- Do households grow, fish or buy the majority of their food? Are bought foods from local or imported (overseas) sources?
- What types of wild foods locally available do the community rely on?
- Observe if there is adequate food supply. Elaborate.
- What are the main farming systems practiced by the community (subsistence, semi-commercial, entirely commercial)?
- What are the main crops and/or livestock in the community?
- What are the main fisheries systems practiced by the community (subsistence, semi-commercial, entirely commercial)?
- What are the main marine and/or freshwater resources utilised in the community?
- Observe if the community is using any climate resistant methods/crops.

Social systems and assets

- Are there different community committees? Who is involved in these committees? How is this decided on? How many committees are led by men, how many by women?
- How does the community's dispute resolution system work?
- How often does the community hold community events or activities?
- What is the status of collaboration in community activities?
- Are there certain groups of people that are less involved in community activities? Elaborate.
- Does the community have shared resources such as equipment/technology? If so, give examples and does each work effectively?
- How does the community primarily source information and news (text, radio, TV, Internet, social media, information boards etc)? Specifically related to climate and weather?
- Is this climate and weather information used to plan for the future? Elaborate.
- How is the community warned of an impending extreme weather event?

- Is climate/weather data recorded? Elaborate.
- How does the community and households prepare for disasters (in terms of food security, protection of life and physical assets etc)?

Financial assets

- What are the main sources of income in the community? Create a list and indicate percentage of households that utilise that source of income.
- Are there access to markets for this community (either directly or through another person) to sell goods?
- What goods are traded within and amongst the community?
- Is there a community disaster fund? A government provided disaster fund? Elaborate.

Natural resources

- Observe the location and physical geography of the community.
- How much land does the community control? How much is owned outright? How much is leased?
- What is the approximate land area of various natural resources (reefs, mangroves, forests etc) available to the community?
- Observe what conservation activities are being undertaken.
- What climate and environmental changes have been experienced over the last ten years? What are the anticipated changes?

Physical infrastructure

- Is there a community evacuation centre? Elaborate.
- Observe what most of the houses are built from in the community.
- Observe any physical infrastructure in the community (wells, bores, roads, generators, water tanks and pumps, sea walls, communication infrastructure etc).
- Observe waste management system – for human waste, kitchen organic waste and inorganic waste.
- Does the community have specific buildings in case of cyclones, storms, flooding?
- How have the materials and design of housing changed over the last 50/25/10 years?

COMMUNITY FOCUS GROUPS: GUIDE

1.0 Introduction/ICEBREAKER

The facilitator will introduce themselves and the purpose of the visit, emphasising that it is a research project and will not result in tangible outcomes. An informed consent statement will be read out to participants for them to verbally consent to participating in this study, and then signed by a designated spokesperson on behalf of the group. The consent statement will

include details of participation, how the data will be used, and ensure participants are aware that they can withdraw from the research at any time if they wish.
Ask the group participants to each introduce themselves, and provide some details about themselves (something they'd like to share – what they do for their livelihood, how many children/grandchildren they have etc).

2.0 Vulnerabilities/Threats to livelihoods

- What do you think are the most positive things about living in this community?
- What things do you value most about the way you live?

- Exercise: Create a list of the main threats to livelihoods in the community, and then rank them to understand what the main threats to livelihoods are (as well as where climate change potentially fits in with other vulnerabilities/threats).
- Thinking back to ten years ago, are these threats the same or different (add or delete from the list) and how would you then rank these back then?

3.0 Climate events/shocks and responses

- Can you remember the first time you heard of the term "climate change"? Can you tell me about it (when and where)?
- What does the term "climate change" mean to you?
- Over the last ten years, have you noticed any changes to local weather or climate? If yes, what have these been?

- Does your community have a disaster management or climate change adaptation plan? If so, can you tell me about it? (This will be good to compare between what plans are actually there and the level of knowledge surrounding it by the community).
- Have any community members attended any climate change workshops/trainings/meetings? If so please provide details (eg. when and where? what did it involve? who provided it? was it useful?).

- Exercise: Create a timeline showing the major climatic events that have occurred in the community (including both slow onset climatic changes such as sea-level rise or drought and major/minor rapid onset events such as cyclones or flooding events).

- Exercise: From the timeline established above, give details of what you did ('adaptation responses') to help the community respond to these changes/impacts. Discuss each of these responses: Were they community-run initiatives or externally funded/ implemented initiatives?

- If an externally-run initiative (say up to 3 most important ones):

- What was the timeframe of the project (start and end date)? Was this the intended time frame?
- Who implemented the project? Who funded it?
- How was the community involved in the project – design phase, implementation phase and evaluation phase?
- Who in the community was involved?
- Why was this community chosen to have this project?
- Was there any input or involvement in the project from regional/provincial or national government bodies?
- What were the main activities and outputs from the project?

4.0 EVALUATION OF 'ADAPTATION RESPONSES'

The following section relates to the last (or considered to be most important) 1-2 adaptation projects implemented in the community. A performance rubric will be drawn up on butcher's paper and respondents asked to indicate, referring to each of the following evaluation indicators (appropriateness, effectiveness, equity, impact, sustainability – definitions on p 6), how well the project achieved them on a five-point scale (highly effective, good, acceptable, less than acceptable, terrible). Each participant will be given a sticky dot to place on the 5 performance rubrics corresponding to the 5 evaluation indicators.

4.1 Appropriateness

- Did the project deal with the main issues/concerns and priorities of the community?
- Were there things that you would have liked the project to do but it did not? If yes, what were they? And why weren't they addressed?
- Were there aspects of the project that were not relevant to the community? If yes, what were these?
- Did the community like this project when it was first suggested?
- How was the project first explained to the community, what language was used, and who did the explaining?
- Were local experiences and knowledge about seasons, climate, managing resources (or other local knowledge) incorporated into the design of the project?

- Exercise: Using the performance rubric, on a scale of 1-5, how appropriate was the project to the needs and context of the community?

4.2 Effectiveness

- What worked really well? Why/Why not? Elaborate.
- What didn't work well? Why/why not? Elaborate.
- What challenges did the project face?
- Do you think the project achieved its intended objectives?

- Was there any opportunity to modify or adapt the project after it was implemented to improve adaptation practices or address new information?
- What specific products or outputs did the community (and you individually) gain from this project? (e.g improved skills? crops? water tanks? information? technology?).
- Has the project increased the community's ability to respond to climatic events? If not, why not? If yes, how?

- Exercise: Using the performance rubric, on a scale of 1-5, how effective was the project in enhancing the community's ability to adapt to the impacts of climate change?

4.3 Equity

- Did everyone in the community have the chance to be involved in the project (design phase, implementation phase and evaluation phase)? If yes, how were women involved, how were young people involved?
- Did you personally feel adequately informed and consulted throughout all stages of the project?
- How clearly and effectively was information communicated to all within the community about the project (by those implementing the project)?
- Has everyone benefited from the project or just some people? If only some, why?
- Does the community continue to manage the project? And who takes responsibility for this?

- Exercise: Using the performance rubric, on a scale of 1-5, how equitable was the project in including and benefiting everyone in the community?

4.4 Impact

- Is everyone in the community better off now that the project has been completed?
- What have been some of the positive and negative consequences that have arisen from the project? Were these direct or indirect consequences? Intended or unintended?
- If you were to do the project again, would you do anything differently? If yes, what?
- Have your perceptions and understanding of climate change changed since the project has been implemented? Why/why not?

- Exercise: Using the performance rubric, on a scale of 1-5, what was the impact of the project in providing long-term benefits to the community?

4.5 Sustainability

- Are you still implementing the activities/ideas associated with the project? If not, which ones are no longer implemented? Why? Which ones are you still implementing? Why?

- Did the project involve short (say less than 1 year) or long term (greater than 1 year) goals? Did you want the project to be focused on more short term or long term project goals?
- Was there any additional support available during/after the implementation phase of this project from government, donor organisations or other institutions? If not, do you think additional support would have been beneficial to the project? What were/are the more difficult phases of the project that could have benefited from additional support?

- Exercise: Using the performance rubric, on a scale of 1-5, how sustainable has the project been?

4.6 Livelihood Assets

Thinking about before the project was implemented compared to now, rate on a scale of 1-5 (much worse, a little worse, the same, better, much better), how much better off the following livelihood assets are since project implementation. A table will be drawn up on butcher's paper with all the below livelihood assets listed on the LHS and across the top will be the 1-5 scale. Again, each participant will be given a sticky dot to place on the table with the 5-point scale for each of the below assets.

Assets that predominantly evoke responses as better/much better or a little worse/much worse, or where there is diversity amongst respondents, will be asked to elaborate and explain further why this was the case.

- *Terrestrial ecosystem health*
- *Marine or freshwater ecosystem health*
- *Food sources, access and availability*
- *Water quality, access and availability*
- *Energy quality, access and reliability*
- Housing *safety and adequacy*
- *Community health (access to and quality of health services)*
- *Access and quality of schooling/education*
- *Access and quality of information (climate or otherwise)*
- *Access to skills and training*
- *Access to government processes and decision-making at local, provincial and national levels*
- *Community cohesiveness*
- *Community physical infrastructure*
- *Income/job reliability and satisfaction*
- *Access to financial assistance (savings, loans, remittances, pension, credit, social welfare benefits)*

5.0 FINAL REMARKS

The facilitator will ask participants if there are any final thoughts or anything they wanted to express about the project(s) or more generally that hasn't come up yet.

Participants may also like to discuss some of the issues that came up during the FG one-on-one with the facilitator which could allow for some greater depth to responses. The facilitator should mention this to participants.
The facilitator should also indicate what the next steps are in this research project, and thank the participants for their important insights and time given to this project.

Note: Evaluation Terminology

The following evaluation terms are defined as follows.
Appropriateness – The overall relevance of the project and associated suitability of the intervention in terms of community priorities and their cultural and social ethos.
Effectiveness – The extent to which the project, and related interventions, has achieved its intended objectives, and includes the products, capital goods and services which resulted directly from the intervention.
Equity – The inclusion and benefit of project interventions for everyone within the community, specifically with regards to any potentially marginalised groups.
Impact – The direct or indirect, intended or unintended, long term effects of the intervention; both positive and negative.
Sustainability – The extent to which project interventions have been maintained and endured post project lifecycle, and the extent to which processes have continued once the initial inputs, including funding, materials and training have ceased.

Appendix 3: Participant Information Sheet and Consent Form

OPTIMISING COMMUNITY-BASED ADAPTATION IN THE PACIFIC ISLANDS

PARTICIPANT INFORMATION SHEET

I seek your assistance in participating in this research that is required to complete my PhD. The purpose of this research is to optimise community-based climate change adaptation projects that have been implemented in Pacific Island communities. This will help provide information on how these projects can be implemented in the future to generate the best outcomes for all stakeholders involved.

The focus groups will go for approximately two hours and will involve a series of questions surrounding five key areas: community characteristics, livelihood assets, vulnerabilities, responses to climate change and evaluating these responses.

As a participant in this research, your participation is completely voluntary. You are welcome to leave at any time if you do not feel comfortable being involved in this study. You may refuse to answer any questions you do not feel comfortable answering at any time. Your identification and information will remain completely confidential and will not be used in any future documents without your permission.

These discussions will be recorded using an audio device in order to preserve and analyse the information given which will be later translated. You are also free to ask any questions or raise any concerns you may have about this study at any time. You will also be able to stay in contact after this study has been completed to provide feedback or access the finished document. As a participant you will be debriefed with the findings from the research to ensure that information gathered from you has been accurately represented.

This study adheres to the Guidelines of the ethical review process of The University of Queensland. Whilst you are free to discuss your participation in this study with project staff (details provided below) if you would like to speak to an officer of the University not involved

in the study, you may contact Sebastian Darchen, the Ethics Officer on 07 3365 3910, or s.darchen@uq.edu.au.

Annah Piggott-McKellar
Doctor of Philosophy, School of Earth and Environment Sciences
The University of Queensland, Brisbane
Email: a.piggottmckellar@uq.edu.au

OPTIMISING COMMUNITY-BASED CLIMATE CHANGE

ADAPTATION IN THE PACIFIC ISLANDS

CONSENT FORM FOR FOCUS GROUP PARTICIPANTS

We acknowledge that we have listened to and understood the participant information sheet. Collectively, as a group we provide consent to be participants in this focus group as part of this research project on community-based climate change adaptation interventions.

- We have received clear and concise information about this research project and what is required of us during the focus groups
- We acknowledge that our participation is purely voluntary and there will be no direct benefit or reimbursement for our role in this study
- We acknowledge that an audio recording device will be used for the duration of the focus group
- We understand that any identifying information will remain confidential and will not be used in any future documents or publications
- We understand that we are able to leave during the focus group at any time or refuse to answer any questions without any explanation or penalty
- We acknowledge that we are able to make contact with the persons involved in this study in order to seek any information about the future use of this research project and to raise any concerns if necessary

Participant's Name:

_____

Participant's Signature:

_____

Date:

_____

Appendix 4: Ethics Approval Letter

20 March 2017

TO: Annah Piggott-McKellar

FROM: Dr. Sébastien Darchen, SEES Ethics Officer

RE: Application for Ethics Approval

PROPOSAL TITLE: Optimising community-based climate change adaptation in the Pacific Islands [SEES number 20170302]

In my capacity as the School of SEES acting Ethics Officer, I have reviewed the above research proposal for compliance with University and School regulations governing research on human subjects.

The proposed research is not subject to higher level review by the University Behavioural and Social Sciences Ethical Review Committee (BSSERC) for the following reasons: 1) the research does not directly involve human subjects from vulnerable or special populations, 2) the research does not involve any risk above "everyday living", 3) the research is not intrusive, and 4) informed consent will be obtained before data collection, participation is voluntary, and participants may withdraw at any time. The research is thus classified as low risk and ethics approval at the School level is appropriate.

The research proposal, as presented, complies with the National Statement on Ethical Conduct in Human Research and the associated university regulations. You may conduct the research subject to the following conditions: 1) the survey/interviews should be conducted as described in the research protocol; 2) participants should not be personally identifiable in the results without explicit permission of the participant; and 3) the data collected is to be kept in a secure location. Should any of the above conditions change, you must refer the amended research protocol back to the SEES Ethics officer.

If you have questions about the ethics review process, please contact me.

Dr. Sébastien Darchen (s.darchen@uq.edu.au)
Acting Ethics Officer
School of Earth and Environmental Sciences